AVIATION WEEK

JULY 7, 1947

INCORPORATING AVIATION AND AVIATION NEWS

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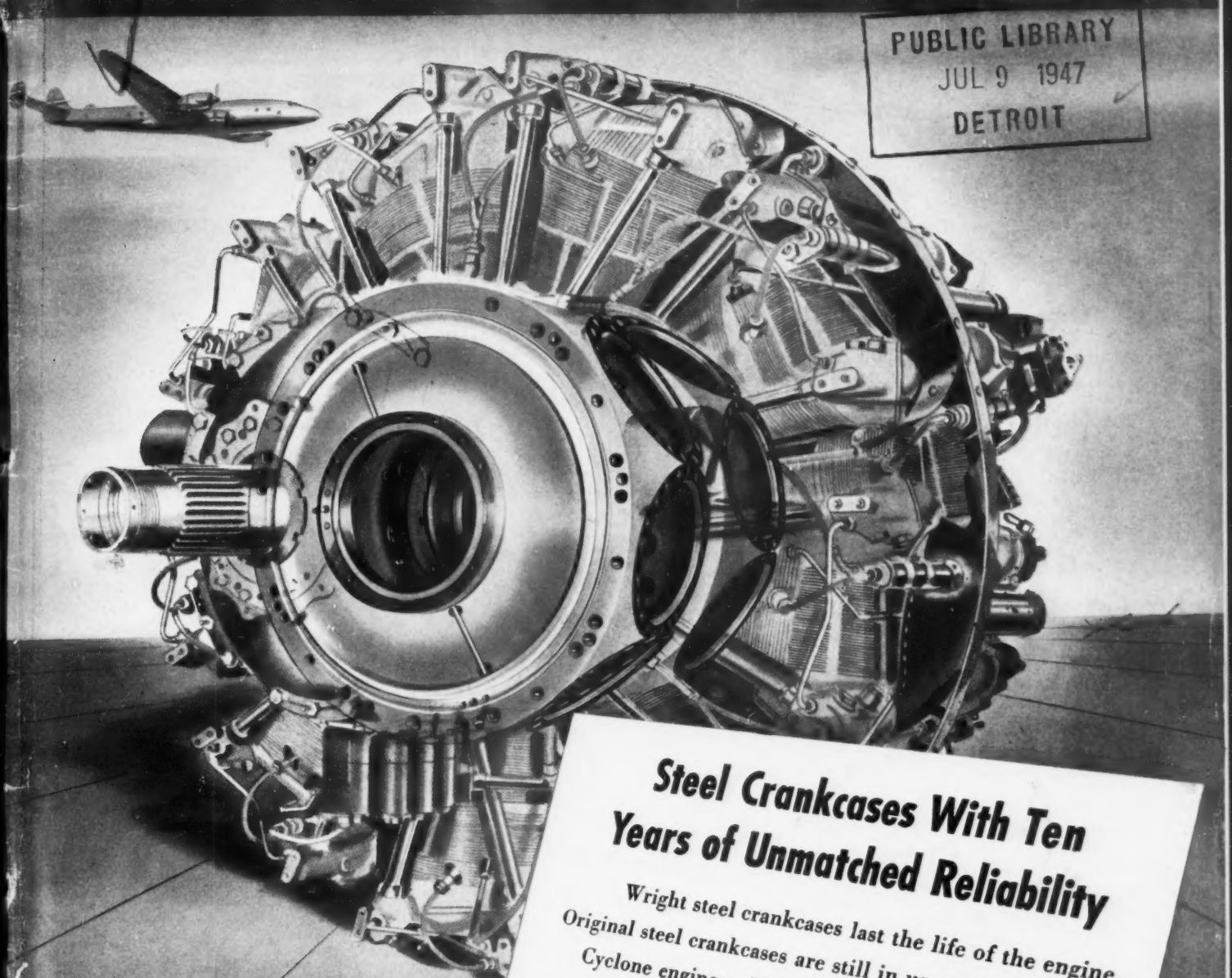

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To the airline operator, steel crankcases guarantee reduced overhaul costs and unmatched reliability —a feature available only in Wright Cyclone engines.

POWER FOR AIR PROGRESS

SEE PAGE 81

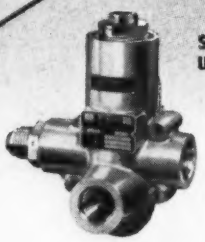
A DIVISION OF CURTISS WRIGHT
FIRST IN FLIGHT

WRIGHT
AERONAUTICAL CORPORATION
WOOD-RIDGE NEW JERSEY

VICKERS HYDRAULIC EQUIPMENT on the

CONVAIR-240

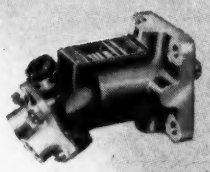
R v. 47 July—Sept. 1947



Vickers
Series AA-34500
Unloading Valve.

Vickers
Series AA-12300
Balanced Piston Relief
Valve (2 Port).

Vickers
Series AA-14300
Accumulator.



Vickers
Series MF-3906 Constant
Displacement Piston Type
Motor.

The 3000 psi main hydraulic system and the independent supercharger system for cabin pressurization and air conditioning of the Convair-240 include the Vickers aircraft units illustrated here. Vickers has a complete line of aircraft hydraulic equipment to exactly meet the needs of individual applications. For detailed information, please write us your requirements.

Vickers
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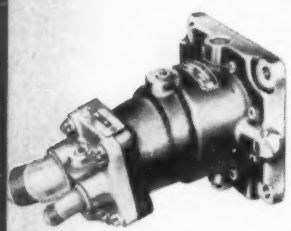
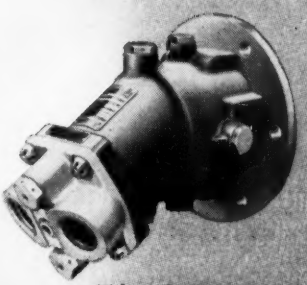
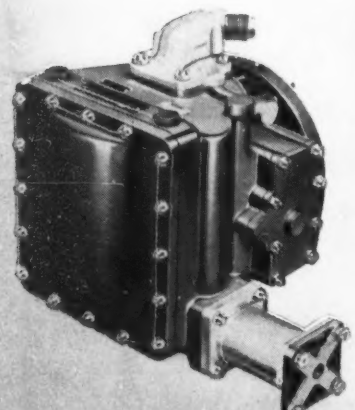
Relief Valve
(4 Port).



Vickers Series PF-3911 Constant
Displacement Piston Type Pump.



Vickers Series PF-3915 Constant
Displacement Piston Type Pump.



Vickers
Series AA-33000 Piston Type Pump.
(Accurately controllable — infinitely
variable volume with reversing flow.)

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OIL HYDRAULIC EQUIPMENT
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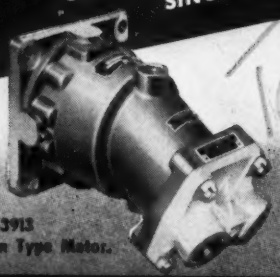
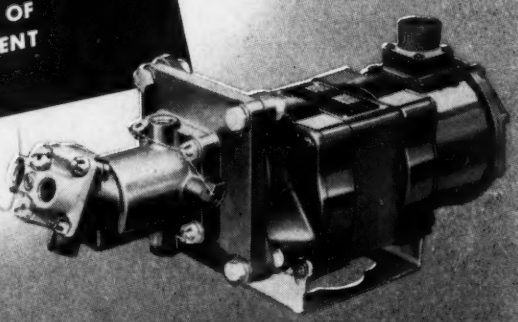


Vickers Series MF-3913
Constant Displacement Piston Type Motor.



Vickers Series AA-19020 Motorpump.

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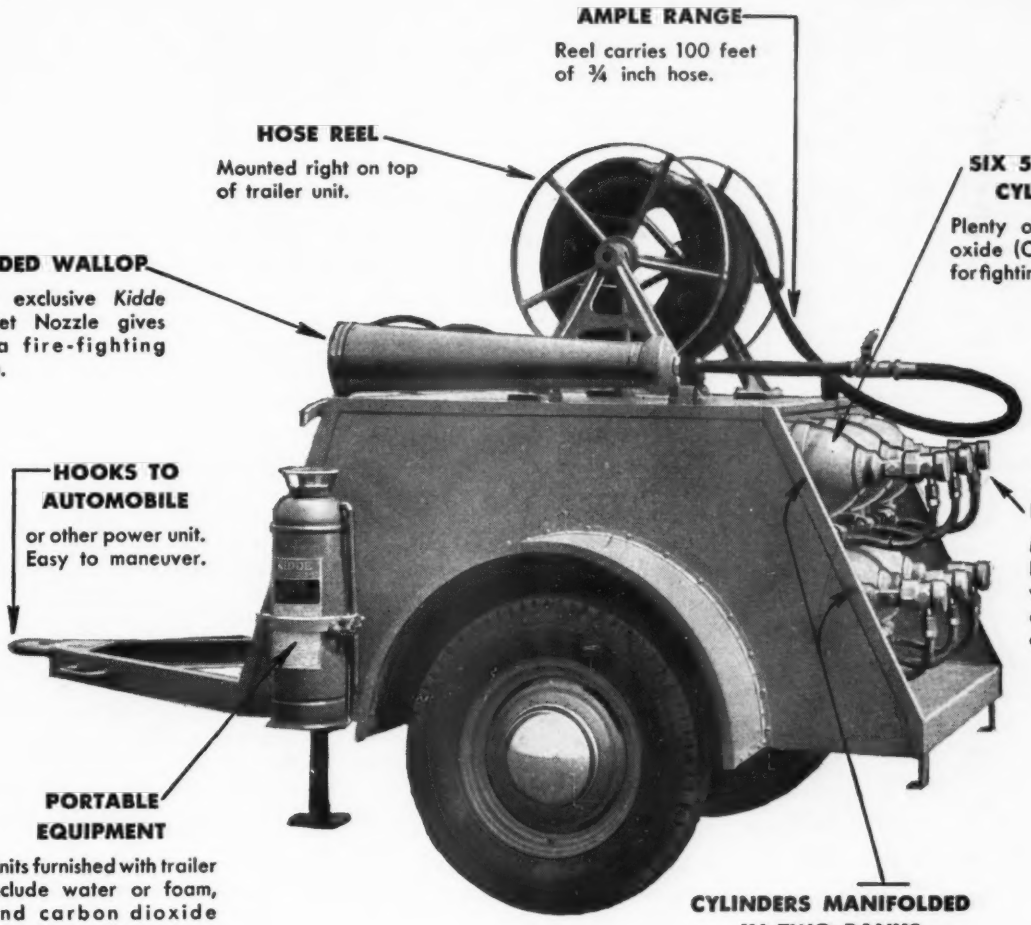

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Reel carries 100 feet of ¾ inch hose.

HOSE REEL
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Plenty of carbon dioxide (CO_2) capacity for fighting severe fires.

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Kidde

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- 3-minute manually operated parachute flares
- Signaling ammunition
- Aviation Flare pistols and signals

KILGORE MFG. CO.

International Flare Signal Div.

WESTERVILLE, OHIO

Vol. 47

AVIATION WEEK

No. 1

INCORPORATING AVIATION AND AVIATION NEWS

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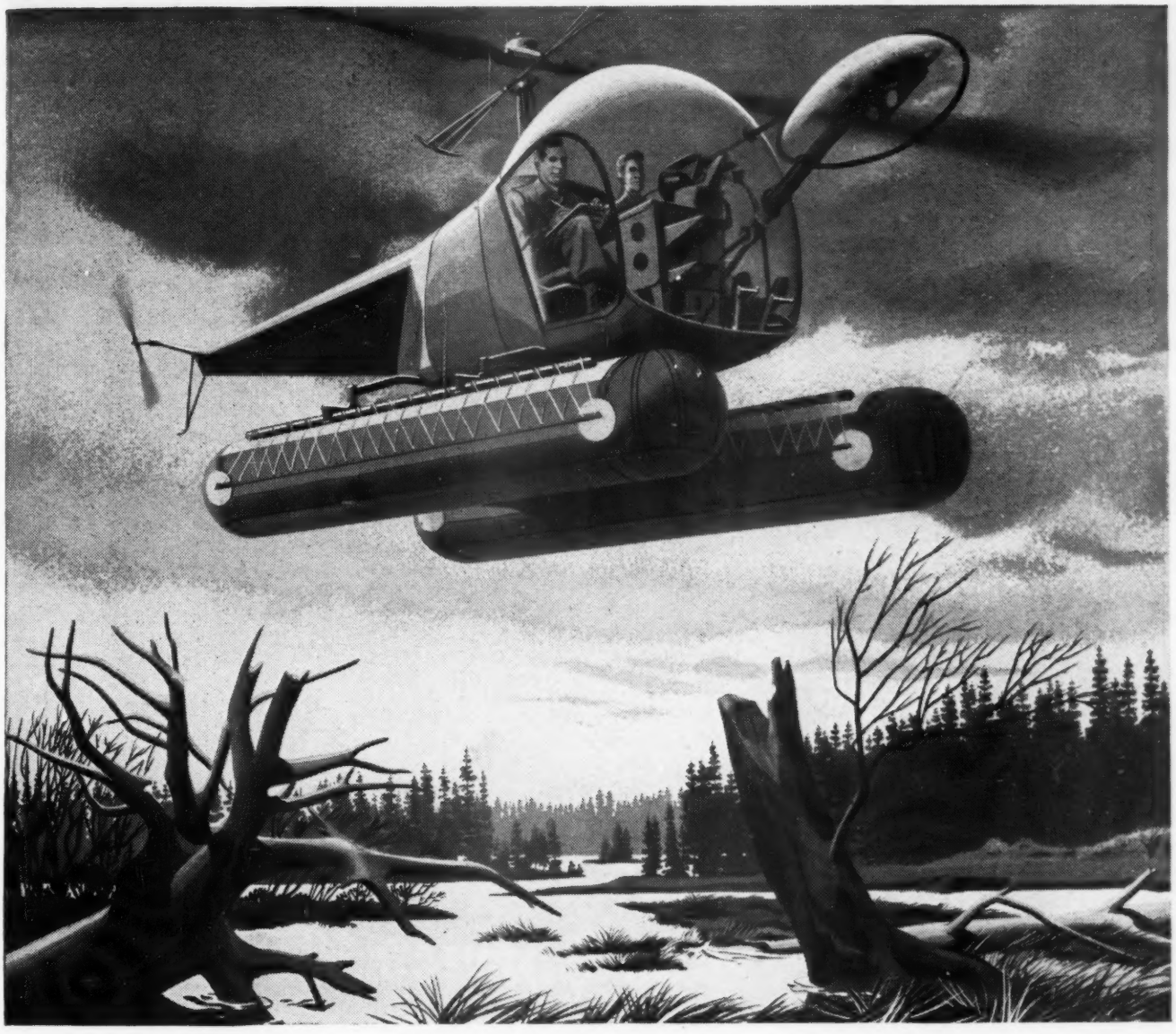

Prospecting by helicopter—*underground*

The utility of the Bell Helicopter reaches even to the muskeg, water and swamp of the Ontario wilderness — a land of untold riches. It explores for oil over the tangled bayou land of Louisiana. It is being readied for similar geological exploration in Mexico and Ecuador . . . and other even more far-flung assignments are being planned.

Hans Lundberg, Toronto, first made commercial use of a Bell Helicopter last summer when he leased a machine and equipped it with magnetic survey instruments. Then he set out for the north — in search of hidden ore deposits.

In one hour, from the Bell Helicopter, the same work was done that had required seventy days by skilled ground crews. Even in flight, the helicopter proved a steady platform for Lundberg's delicate instruments. **Findings tallied 100% with the known facts.**

With the Bell Helicopters purchased, Lundberg Explorations, Ltd., is now rapidly expanding its aerial explorations.

Today, Bell Helicopters are at work, operating profitably, from Maine to California, from Illinois to Texas. In Canada and Sweden. They are doing their jobs —almost any jobs their owners can conceive — in Hanson and Norwood, Mass., Rochester, N. Y., Camden, N. J., Brooklyn Village, O., Tucson, Ariz., Portland, Ore., Yakima, Wash., Los Angeles, Calif., Chicago, Ill., and New York City. They dust and spray crops, orchards, cattle . . . gather the news . . . speed mail and merchandise . . . survey real estate and woodland and highway traffic . . . patrol pipe and power-line and forest.

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PRODUCT OF BELL *Aircraft* CORPORATION

PIONEERS IN JET-PROPULSION, RADIO-CONTROLLED FLIGHT AND SUPERSONIC AIRCRAFT FOR THE U. S. ARMY AND NAVY. DESIGNERS AND BUILDERS OF THE WORLD'S FIRST COMMERCIALLY LICENSED HELICOPTERS FOR LAND AND WATER.

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Texaco is proud that Northwest uses *Texaco Aircraft Engine Oil exclusively* on its trans-Pacific flights . . . just as it does on its routes coast-to-coast in the U. S. and to Alaska. This preference for Texaco is based on performance, and is shared by leading airlines everywhere. In fact—

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FOR THE AVIATION INDUSTRY

Tune in...TEXACO STAR THEATRE presents the NEW TONY MARTIN SHOW every Sunday night. See newspaper for time and station.

THE AVIATION WEEK

SAFETY IN THE AIR—Although newspaper headlines had calmed down somewhat after proclaiming the latest series of air crashes, repercussions continued in the airlines. Big question: Can the carriers survive economic drains occasioned by severe safety regulations?

Speculation on future reports of the President's special investigating board was the top conversation in the industry. In addition to chopping take-off loads, the Board may:

1. Make a third cockpit crewman mandatory, a pilot-navigator, long demanded by pilot union chief Behncke.
2. Raise a hullabaloo over CAA practices and procedures.
3. Amend Part 04 of the CAR. Some previous revisions have not even gone into effect. This may be stage dressing, as DC-3s operate under 04, not the DC-4s which started the present storm.

LANDIS RUNS THE SHOW—CAB Chairman James Landis is running the presidential board. Most informed observers say he named its membership. While a popular quiz game among aircraft manufacturers is why none of their representatives was included, the industry's top policy-makers really are not deeply concerned. According to one version, Landis telephoned a manufacturers' spokesman to invite him to participate but, strangely, was unable to reach him and the matter was not followed up. Aircraft makers are convinced, however, that original design and construction are not involved.

LANDIS-INDUSTRY RIFT—There is growing evidence that the airlines and Landis are getting farther apart every day. Landis is adamant on the safety subject. So is the Air Line Pilots representative. The airlines want safety too, but they point out that in transportation you can make so many safety regulations you will never operate a schedule. The only wreck-proof train, plane or bus is one that never moves. Airline management is deeply concerned over the economic aspects of over-stringent regulations which may be imposed by the Truman Board.

PERSONAL PLANE SHAKEUP—Next to airline safety, biggest conversation piece was Ryan's purchase of the Navion and Texas Engineering's acquisition of the Globe Swift and Johnson Rocket.

Because of the depressed personal plane market, there have been no optimistic evaluations of these moves. Both purchases have intriguing angles. Resuscitation of the Navion puts one of the lightplane's earliest practitioners back into the business. Although he has been away for a long time, Ryan is not a greenhorn.

First act of Temco after buying the Swift was to announce a big price cut. Main interest in this attaches to the fact that while everyone agrees personal planes are too expensive, few manufacturers have admitted, or will admit, that they can cut prices.

Don't forget that the Swift, with a 125hp engine and a retractable landing gear, now drops plump into the same general price class as the other all-metal ships on the market—Luscombe, Cessna and Ercoupe—two-placers with 85hp. Temco has a good production record. It has written off all development and tooling costs and took over a sizable inventory of completed planes. Meanwhile, Luscombe cut production; Piper deferred action on a preferred dividend.

The personal aircraft industry is in a revolution. Result will be fewer manufacturers, lower prices, and improved models to keep up with the competition.

MILITARY AIRCRAFT AND THE HILL—While sharing the general interest in the safety investigation, military aircraft manufacturers were keeping an eye on Capitol Hill last week. With the shape of this fiscal year's military and Naval appropriations now known, the industry can figure out—tentatively—about where they stand.

It's an uncomfortable spot. With money already obligated, plus fiscal '48 funds, the next 12 months should be no worse than the last. They should be a little better. But after that the outlook is dark.

Heavy aircraft makers are watching most carefully the national air policy legislation moving in the Senate. If this can be enacted in the waning days of this legislative session, it may exert a powerful influence on future appropriations. If an air policy bill fails to get by the "back-home" rush, some manufacturing people feel the last opportunity has passed.

WASHINGTON OBSERVERS PREDICT:

► The new world's speed record of 623.8mph may be broken in a few weeks by the same Lockheed P-80R that set the new mark. Pilot Albert Boyd found no compressibility trouble, and did not use full power from the Allison-built J-33 engine. Florida is being discussed as scene of the next attempt.

► Despite the flat statement of the British Minister of Civil Aviation that Britain would not buy more U. S. transports except those already on order, British Overseas Airways are likely to receive more Constellations.

► Export-Import Bank shortly will announce another manufacturer's participation loan for foreign purchase of U. S. transports.

► Unification of the armed services is almost certainty. Cutting off hearings in the House Armed Services Committee was the tip-off, according to merger proponents.

► Although CAA is getting its cumbersome airport aid machinery moving, insiders are convinced the regulations will still keep the pace to a crawl.

TAN-O-LITE*

TOP IT OFF — WITH TAN-O-LITE!

A remarkable new upholstery fabric! Developed in cooperation with automotive and aircraft engineers, TAN-O-LITE has extraordinary strength . . . lightness . . . durability . . . beauty. Its stain-proof finish is easy to clean, never cracks or peels, withstands years of abuse. You'll admire its supple sleekness, its glowing, stay-bright colors, its rich leather effects. And this vinyl-coated fabric is completely FLAMEPROOF. Its versatility, its low cost makes it practical for a multitude of other uses, too. Write today for complete information and details.

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BLACKBURN PRODUCTS, INC.

* Reg. U.S. Pat. Off. 24 Avenue B, Newark, New Jersey Makers of Simulated Leather

A BETTER PRODUCT TODAY—FOR A BETTER BUSINESS TOMORROW

NEWS DIGEST

DOMESTIC

William A. M. Burden's resignation as Assistant Secretary of Commerce for air has been accepted by President Truman as of June 30. Pending appointment of a successor, Burden's duties will be divided between CAA administrator T. P. Wright and William C. Foster, Under Secretary of Commerce.

Western Air Lines will inaugurate its AM 63 route extension between San Francisco, Portland and Seattle around July 15.

Maj. Alexander P. de Seversky was awarded the Harmon International Trophy for his wartime contributions to the development of long range escort fighters and strategic bombardment theory.

Continental Air Lines has appointed Allen P. Shelley as director of engineering and maintenance to replace Stanley R. Shatto, who resigned effective July 15. Ronald C. Kinsey, who recently resigned as vice-president of Western Air Lines, has been named vice-president of Continental with offices in Washington.

House Armed Services Committee approved legislation authorizing a $254,696,000 Naval public works program including $34,000,000 for development of the Pt. Mugu, Cal., guided missile test range.

President Truman requested a supplemental appropriation of $1,336,000 to cover payment on an unanticipated volume of airmail carried during the last few months of the 1947 fiscal year.

Chan Gurney (R., S. D.) introduced legislation authorizing a War Department public works program estimated at $225,000,000 for the 1948 fiscal year. It includes numerous additional AAF facilities.

William Van Dusen, former public relations director of Pan American Airways has organized his own firm to specialize in industrial and advertising counselling. Offices will be at 250 Park Ave., New York City, and in Washington.

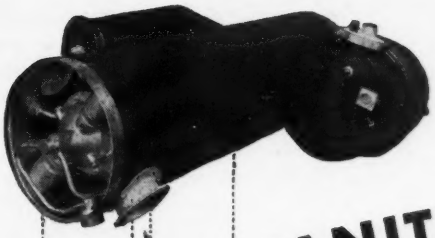
FINANCIAL

TWA broke into the black for the first time this year during May with a profit of about $100,000, according to President LaMotte T. Cohu.

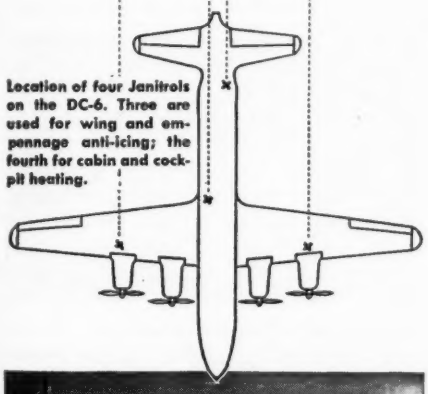
Mid-Continent Airlines reported net profit of $6,512 and a 64.7 percent load factor in May against $38,453 profit and a 76.1 percent load factor for the same month last year.

Consolidated Vultee Aircraft Corp. reported a net loss of $769,287 for the six month period ending May 31, after an estimated credit of $1,708,206 resulting from tax carry back provisions.

Boeing Aircraft Co. announced a $10 a month salary increase for 3,000 non-union office and supervisory employees effective July 1.



LOOK TO JANITROL FOR THE NEWEST IN HEATING



Location of four Janitrols on the DC-6. Three are used for wing and empennage anti-icing; the fourth for cabin and cockpit heating.

ALTHOUGH more than 50,000 Janitrol Whirling Flame Aircraft Heaters have proved their dependability under all flying conditions . . . research and development work here at Surface Combustion has not slackened.

Just as Janitrol engineers originated the fuel injection system and the adaption of spark ignition for aircraft heaters, so new advancements are still being tested in the laboratories and in test flights to provide for even greater passenger comfort and safety.

The use of four Janitrols in the Douglas DC-6 for complete year 'round air conditioning and anti-icing of wing and empennage is a typical example of Janitrol's contribution to modern flying.

Janitrol Combustion-Type Heaters are available in several models ranging from 15,000 to over 300,000 Btu per hour output.

This wide experience in the design, installation and servicing of aircraft heaters and the complete facilities of our research laboratories can be made useful to you . . . let us know your problem. Write Aircraft Heater Division, Surface Combustion Corporation, Toledo 1, Ohio.

This instrument enables Janitrol engineers to visibly analyze on the screen of an oscillograph, the electrical characteristics of control devices.

Electronic temperature recorder is used to determine completeness of combustion and to accurately record output temperatures.

Thorough testing and inspection of heater ready for shipment on specially built Janitrol motor-generator testing machine.

Janitrol

AIRCRAFT HEATER DIVISION • SURFACE COMBUSTION CORPORATION • TOLEDO 1, OHIO

Martin Memo

Published by The Glenn L. Martin Company

Baltimore 3, Maryland

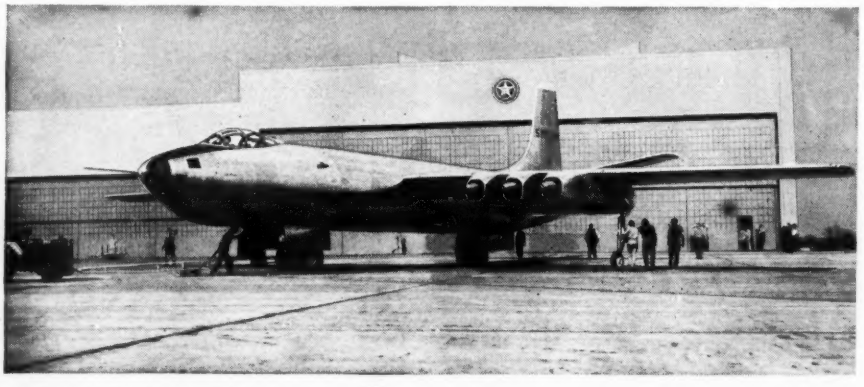
On Leading Airlines Soon . . . Here, the ultramodern Martin 2-0-2 airliner is shown in flight during CAA certification tests. Speedy Martin luxury liners will soon be a familiar sight at airports the world over when they go into operation for these great airlines and cargo carriers: Capital (PCA) . . . Eastern . . . Chicago & Southern . . . United . . . Northwest . . . Delta . . . Panagra . . . Cruzeiro do Sul (Brazil) . . . Aeroposta (Argentina) . . . Nacional (Chile) . . . Mutual . . . Flying Tiger . . . Air Borne Cargo . . . U. S. . . . Willis.

Going Up . . . 235 Miles . . . Rocketry is one of the more advanced research projects of the Martin Company. Now under construction is the Neptune, first of ten experimental rockets, 45 feet long, capable of flights to 235 miles above the earth's surface. These huge rockets, being built by Martin for the Navy, are the first all-American long-range missiles of supersonic speeds.

As a Military Transport . . . The Martin 2-0-2 offers many advantages. It cruises 100 m.p.h. faster than prewar twin-engine transports. It can carry 50 completely equipped troops or 15,000 pounds of cargo. Built-in features include new thermal anti-icing equipment . . . efficient van Zelm ailerons . . . tricycle landing gear . . . large cargo doors for easy loading and unloading.

25,000 Flying Hours . . . During static tests, the Martin 2-0-2 was subjected to wrenching and straining equivalent to 25,000 hours of flying or 10 years of average service. Results of these rigorous tests are further proof of the superiority of the Martin 2-0-2's advanced design and construction.

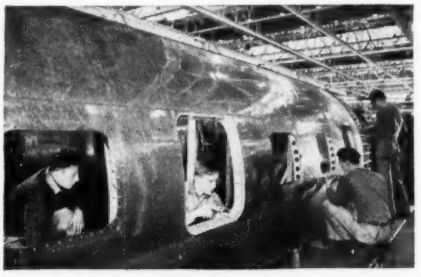
Increased Profits for Airlines . . . The new twin-engine Martin 2-0-2 carries 36 to 40 passengers (or 15,000 pounds of airfreight in the cargo version) at speeds 100 m.p.h. faster than the planes they supplant. But more important is the fact that this modern transport needs only 19 passengers (by ATA formula) to break even. Thus, airline profits with the Martin 2-0-2 can be as high as 50% of the total passenger payload. That's one of the big reasons 15 leading airlines have ordered Martin transports.



Newest Jet Bomber . . . The high-speed, long-range XB-48 was built by Martin for the Army Air Forces. Powered by six jet engines, it is the largest multi-jet conventional type plane yet constructed. The XB-48 also pioneers a new bicycle type landing gear developed by Martin for high-speed aircraft.

Looking for Cold Weather . . . To thoroughly test a new thermal anti-icing system, now standard equipment on all Martin transports, a Martin 2-0-2 was sent to Minnesota. Flying in the cold layers of air north of Minneapolis, the engineers and CAA representatives were able to choose varying types of icing conditions for their experiments. The system which involves passing heated air through the wing and tail assembly proved successful . . . the experiments were acclaimed by aviation experts as a big step forward in all-weather flying.

"A Real Buy" Here's Why . . . Martin has orders for more new transports than any other manufacturer. Through quantity production Martin is able to spread the cost of Martin transports over a larger number of planes, giving purchasers these great new airliners at low cost.



Low-Cost Maintenance . . . These are not windows in the Martin 2-0-2. They are a few of the numerous accessory compartment openings which provide easy access to the 2-0-2's electrical and hydraulic systems. These built-in timesavers mean low maintenance and servicing costs. The openings shown above are in the bottom of the fuselage.

Martin AIRCRAFT

Builders of Dependable Aircraft Since 1909

AVIATION WEEK

INCORPORATING AVIATION AND AVIATION NEWS

Air Safety Board Urges Cuts In Airline Maximum Weights

Sees inadequate safety margin in present requirements; revision of Civil Air Regulations will offset air carrier revenues.

The special Presidential Air Safety Inquiry Board was probing into the controversial fog surrounding the merits of landing aids last week after dealing a stiff blow to airline payloads in its initial recommendations to the president. CAB Chairman James M. Landis, who also heads the special board, indicated at a press conference that these recommendations would be implemented by CAB directives on the subject.

First board report indicated dissatisfaction with present margins of take-off safety and urged added operational weight restrictions that would cut air carrier payloads materially in many cases and ultimately result in sizeable revenue reductions.

Changes recommended in maximum take-off weight formula computations include:

• **Eliminating 300 ft. of runway** in calculating allowable gross weights for accelerate and stop distances to provide more time for pilots to decide whether to decide to stop or continue take-off after reaching the critical speed. Landis indicated that this change would knock from 3,000 to 4,000 lb. from gross weights.

• **Eliminating wind factor** on 4,000 ft. runways that now allows higher gross loads on take-off with increased wind velocity.

• **Adding temperature factor** to subtract 500 lb. from gross load for every 10 deg. rise over standard temperature with a similar increase for every 10 deg. under standard temperature. The board indicated it was aware that this factor did not make full allowance for the addition of weight with increase of temperature but felt that combined with other measures would provide sufficient safety margin. Landis said it was estimated that each additional degree of temperature over 59 deg. F. added 250 lb. to the weight of a DC-4. This would reduce payloads substantially, during the peak traffic loads of the summer season when airlines count heavily on large profits to tide them over the winter slump.

• **Revising Civil Air Regulations** to make mandatory inclusion of all runway gradient factors in take-off weight computations. CAR now permits gradients to be ignored unless they are "appreciable," it was noted.

• **Banning Landing** of four-engine transports on runways less than 4,000 ft. long without a minimum wind of 25 mph blowing within a quadrant of 45 degrees on either side of the plane's nose. The board considered closing all runways of less than 4,000 ft. length to four engine operations (estimated to be 15 percent of all runways now authorized for such use) but decided the additional hazards of that action would outweigh any safety achieved.

Other recommendations included provision of better wind information to pilots; requiring lighted windsocks at all commercial airports, standardized cockpit check lists on four eigine aircraft of the same type; early completion of a U. S. Coast and Geodetic Survey project to make accurate obstacle and terrain maps of major airports and redesign of the gust lock on DC-4.

► **New Gust Lock**—This last recommendation is already being implemented by the Douglas Aircraft Co. It has not yet been determined whether the gust-lock was on or off when a United Airlines DC-4 crashed off the end of a 3,533 ft. runway at LaGuardia Field last month.

All of the initial recommendations were based on a study of the LaGuardia crash which revealed that CAA had not checked airline maximum take-off weight computation formula as required by the Civil Air Regulations and that a difference in interpretation of CAR between CAB and United Air Lines, unchecked by CAA, resulted in a 3,000 lb. overload on the fatal crash. Landis pointed out that it has not yet been determined whether the overload was a primary cause of the accident.

► **Pilots Triumph**—The Board's recommendations represented a triumph of the Airlines Pilots Association over airline management represented by the Air Transport Association. ALPA fought addition of the wind factor in increasing take-off gross weights when it was introduced in 1941 and has long campaigned for a temperature factor as recommended by the board. To soothe airline protests over the new weight formula the board will hold a public hearing on the changes at which all interested parties may state their case. Both the Air Line Pilots' and ATA representatives have been supported by their own technical experts in the closed board sessions.

Meanwhile three other crash investigations continued to tax CAB Safety Bureau investigators. Hearings opened on the crash of a Capital Airlines (PCA) DC-4 near Leesburg, Va. that killed 50, and special investigators continued probe of a Pan American Constellation crash in Syria fatal to 15 of 36 aboard. Industry attention was centered on the Syrian accident since it was caused by at least one and possibly two engine fires on a Model 49 with fuel injection engine that had been approved for operation by CAB after a series of engine fires resulting in grounding of all Constellations last summer. Preliminary investigation of the Eastern Air Lines DC-4 accident near Bainbridge, Md., has been completed and a final report is in preparation.

CAA, which has been under heavy criticism during closed Board sessions for failure to adequately enforce CAR, revealed it has collected $19,500 in fines from airlines during the past year for safety volations. The CAA record showed 11 separate fines ranging from $100 to $9,500. Panagra paid the largest fine as a consolidated penalty for failure to maintain firefighting equipment; dispatching a plane when pilots did not have proper maps, and failure to maintain adequate maintenance record. United paid $5,000 for making a short cut off the airways on the Kemmerer-Rock Springs, Wyo. route.

DC-6 SHOWING

United Air Lines, which lost over $3,450,000 in the first quarter of 1947, will be in the black during the second quarter, according to President W. A. Patterson. Reporting that his company had 12 DC-6s in operation during the first week in June, Patterson said the planes will be an important factor in the better financial showing. UAL expects to receive eight DC-6s a month until 35 are on hand. The carrier's new DC-6 run to Hawaii is operating close to capacity, and on July 1 Washington-San Francisco DC-6 flights with one stop at Chicago will be inaugurated.

Senate Group Asks State Airport Channel

Urges legislation making funneling of Federal aid through local governments mandatory.

The issue of whether federal airport funds should be allocated to cities, or exclusively to states, was revived in Congress last week when the Senate Interstate and Foreign Commerce Committee reported out legislation making mandatory the funneling of federal aid through state governments.

During Congressional consideration of the 1946 Airport Development Act, the Senate voted such a stipulation. The House approved a provision giving the CAA Administrator discretion to allocate federal airport funds to states, cities, or other local political subdivisions. A year's Senate-House deadlock was broken by adoption of a compromise provision permitting federal allocations to cities—unless prohibited by state law.

▶ **State Laws**—Twenty-two states have enacted legislation prohibiting the federal-city relationship: Connecticut, Indiana, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, Montana, Nebraska, New Jersey, New York, North Dakota, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Utah, Vermont, West Virginia, Wyoming.

Economy, the desirability of restoring the federal-state pattern in public works development, and the inability of cities to finance airports, the Senate Interstate and Foreign Commerce Committee declared, demand legislation precluding the federal-city relationship in the remaining 26 states. The committee pointed to economies which may be effected in CAA's administrative budget when the agency is required to deal with 48 states, instead of some 100,000 state, municipal and other local governments.

▶ **Supporters Listed**—Supporting the legislation placing the airport program on a federal-state basis at committee hearings were representatives of the U. S. Chamber of Commerce, the Council of State Governments, and the Governors' Conference. The American Municipal Association, the National Institute of Municipal Law Officers, and the U. S. Conference of Mayors opposed the measure, introduced by Sen. Owen Brewster (R., Me.).

In addition to preventing cities from direct dealing with CAA on airport projects, the Brewster Bill makes these noncontroversial amendments to the 1946 Airport Act, most of which were recommended by CAA:

• Instead of specifying Class IV and V airports for Congressional approval, all airports accommodating commercial aircraft—even if they do not meet CAA's technical requirements for IV and V classification—are designated for congressional approval before federal funds can be allocated for their construction. The change means that several Class III airports, accommodating transport aircraft, will be limited to not more than 50 percent federal financing, with the amount of federal aid discretionary with the CAA Administrator. At present, CAA is required to finance 50 percent of the cost of Class I, II, and III airports, but the Administrator is given discretion as to the amount of federal aid, up to 50 percent of the total cost, to be allocated to Class IV and V airports.

• The Airport Act's sponsor financing requirements are eased. At present, CAA must obtain a sponsor's share of the cost of a project before approving it and committing federal funds to its development. Under the proposed revision, the CAA Administrator would be permitted to approve projects as soon as he is satisfied that sponsors' funds will be available as needed.

• Federal lands are made available for non-federal-aid airport projects. At present, federal land may be used only in connection with federal-aid projects.

• The amount of free-space to be allocated CAA for air traffic control is specified. CAA is to be given such space only at the particular airport federal funds helped finance. Under the Airport Act, CAA, by financing a single airport project in a state could demand free air traffic control space at an indefinite number of locations.

• The requirement for CAB certification that a proposed airport project is necessary for air commerce or in the interest of national defense is removed.

EMERGENCY FUEL RELEASE

Heretofore unpublished, this test flight photo of the Truculent Turtle shows plane's specially-designed giant fuel dump chute in operation. It is a 10-in. aluminum pipe carried on rollers within the fuselage. Extended, it is coupled to a three-way valve leading to nose, bomb bay, and aft fuselage tanks. The Turtle could dump 800 gal. in the first 20 seconds; 5,200 gal in six minutes.

Airport Disposal Bill Rewritten in Senate

Congressional efforts to speed disposal of surplus airports took a new form with the reporting to the floor of the Senate a greatly rewritten version of the bill introduced last winter by Senators Brien McMahon and Raymond Baldwin, Democrat and Republican, respectively, of Connecticut.

While the original bill had as one of its main purposes establishment of what in effect would have been a separate set of rules for disposal of airports, the draft coming from the Senate Armed Service Committee makes the measure an amendment to the Surplus Property Act and keeps all the authority granted by the amendment within the framework of that law.

▶ **Nearby Property at Stake**—Chiefly at stake in the writing of the original bill, and the Committee draft, is industrial property adjacent to airports. Purpose of the legislation is to enable War Assets Administration to lump such property with the airport in turning it over to a state or city, with assurance that the government will collect if the agency acquiring the airport later rents the industrial property to a manufacturer.

Under the McMahon-Baldwin bill, there was considerable doubt whether WAA would have any claim to the rental in event of such a transaction. Another aspect of the original bill, cleared up in the Committee proposal, is that it would have made CAA the final authority in determining the disposition of airport property. In the revised version, CAA has power to recommend, with WAA having the last word.

New Price Tags Set For Temco Swifts

New price tags for the two-place all-metal 125 hp. Swift personal plane are set at $3,750 for the de luxe model and $3,250 for the standard model, Robert McCulloch, President of Texas Engineering and Manufacturing Co., Dallas, has announced.

Temco will immediately resume production and delivery schedules on the Swift, as a result of purchase of manufacturing rights from the bankrupt Globe Aircraft Corp., recently, for $328,000.

▶ **$1,000 Cut**—The new price is more than $1,000 below the former Globe list price for the airplane and is expected to enable the Swift to compete successfully in the highly competitive two-place field. As the only 125 hp. allmetal two-place plane with retractable landing gear, and with a 140 mph. cruising speed, in the American market, the Swift at its new price offers serious competition to other two-placers with 85 hp. or less, with fixed landing gear, which are selling in the same general price range.

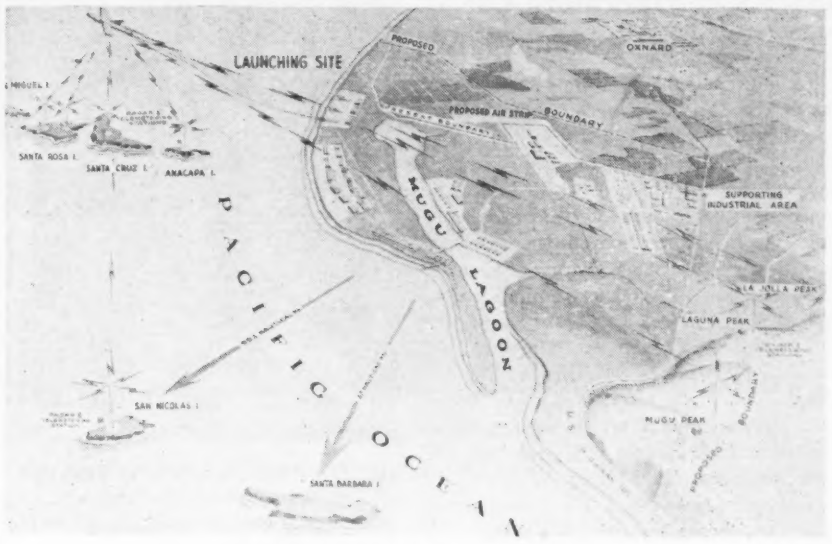
Movement of tools, raw materials, supplies and sub-assemblies from the Globe plant to the former North American Aviation war plant at Grand Prairie, Texas, leased by Temco, is already in progress, following approval of the sale of most Globe assets to Temco, approved by the U. S. referee in bankruptcy.

Temco manufactured approximately 330 Swifts for Globe at the Grand Prairie plant, under sub-contract, and maintained the Grand Prairie Swift production line intact after cancellation of the sub-contract, forced by bankruptcy of Globe. This will make possible immediate resumption of production, and the company is prepared to make immediate deliveries on either model of the 125 hp. airplane.

Company announcement did not refer to the 85 hp. Swift, the first model of the plane to be built, which apparently has been abandoned in favor of the higher horsepower plane.

▶ **Firm Enthusiastic**—"We believe it is the finest plane in the two-place field, since it combines performance with exceptional utility," McCulloch, and H. L. Howard, Executive Vice-President, said in the announcement. "It already has gained international recognition as an excellent cross-country performer which benefits business man and sportsman alike. We wish to assure all Swift dealers, customers and prospective customers that the Swift is in the personal aircraft field to stay. Temco is placing its full resources behind the continued production of the Swift and is now ready to undertake the servicing of these airplanes to any extent necessary."

Temco was organized late in 1945.



NAVY MISSILE CENTER

Sketch of Navy's experimental guided missile test station at Ft. Mugu, north of Los Angeles, showing planned installation of radar tracking and telemetering equipment for long range guided missile tests. Fate of the center will be decided in naval appropriation bills currently before Congress.

Reynolds Plans New Round-World Flight

Another 'round-the-world flight, following a 30,000-mi. route crossing both North and South Poles, will be started about Aug. 1, according to Milton Reynolds, present holder of the world-girdling record. Expected to be used is a converted Convair B-24 bomber, in command of Bill Odom, who piloted the Douglas A-26 Reynolds Bombshell on its record-breaking hop.

Scientific data are to be obtained by ten technical experts expected to comprise crew and passengers on the new flight. Data will be made available to the government and civilian scientific agencies, who will loan equipment for the journey. Radar will be carried, particularly for use over the South Polar regions.

Lysdale Heads Group

Jack Lysdale, Minneapolis, was elected president of Minnesota Aviation Trades Association at the recent Minneapolis meeting, held to discuss aviation insurance and flight school problems. Other officers chosen: Ed Croft, Rochester, vice-president; Lyle S. McKown, Minneapolis, secretary-treasurer; George Hawkins, Marshall, newly elected to board of directors; Clarence W. Hinck, Minneapolis, and Croft were re-elected to the board.

Dutch Lines Merge

Merger of KNILM (Royal Netherlands Indies Airlines) with KLM (Royal Dutch Airlines) has been announced by Albert Plesman, KLM president.

Wiggins Airways Suspends Investments

The lone feeder system certificated for the New England area by CAB more than a year ago is inherently uneconomical and cannot be activated without excessive mail payments unless substantial changes are made in the route structure, Wiggins Airways has informed the Board.

Wiggins said it had incurred $115,000 in pre-operational expenses by the middle of February, 1947, and that in view of its inability to obtain public or private financing for the feeder system as presently set up it had suspended further investments in the carrier. The Norwood, Mass., company declared that AM 79, extending between Boston and Albany, was a marginal route when certificated in June, 1946, and indicated that Board action last March suspending operations on one of the segments because of inadequate airports made the system sub-marginal. Wiggins asked the Board for immediate hearing on its request to extend AM 79 to New York City and other points and on its plea to prolong the life of the certificate. Without amendment, the three-year temporary franchise expires December, 1949.

Competition Sought

Hawaii legislature has asked CAB to hold immediate hearings on certification of a second Inter-Island passenger service to compete with Hawaiian Airlines. At the same time, $532,000 was appropriated for airport construction, bringing the territorial fund to about $1,750,000, including Federal aid.

Tennessee Operators Use New Ground School Plan

Tennessee Flight Operators Association has developed a new type of ground school operation for the GI flight training programs designed to cut ground school time in half and iron out problems which have been confronting flight operators throcghout the country. Flight operators in Tennessee are drawing up their new yearly contracts.

Approved by Veterans Administration and the Tennessee State Department of Education, the system is a home-study course with a text called "Graphic Flight." Graphic Flight is a series of seven books covering the ground school subjects in a new illustrative manner. Meteorology has been redesignated "Moving Weather," a text supplemented by a three-dimensional device which moves across the map.

Under the old ground school program the course for private license required from 30-35 classroom hours; under the new, from 9-15 hours. A commercial license required from 105-110 classroom hours under the old system; under the new, from 25-44. This system may be worked in a flexible manner in order to allow CAA-approved schools to operate the home study course without losing their rating.

Buford Ledbetter, president of the Tennessee Flight Operators Association, developed the home study course and wrote the Graphic Flight series. The rate of 70 cents per student hour in many cases was insufficient for operators to secure competent instructors and necessary teaching facilities, and many students were enrolled in the commercial ground school though all they actually desired was a private license.

HELICOPTER WHIRL TEST TOWER—First photo of new 40 ft. NACA helicopter test tower at Langley Field, Va. shows three-blade Sikorsky R-6 rotor mounted on the tower for preliminary calibration tests of the tower. Motor-driven shaft will turn rotors as large as 60 ft. diameter. Tip speed problems, aerodynamics, flutter and vibration will be analyzed with the use of this new research facility. (Details on Page 21)

Plane-to-Ground Service

Plane-to-ground radio telegraph service for trans-Atlantic passengers will be started as soon as CAA approval is obtained, American Overseas Airlines said. The line has obtained an FCC license to transmit public messages from in-flight planes to the ground. It said it was the first airline to apply for such a license. The new service will be provided over the North Atlantic at rates available to steamship passengers for ship-to-shore telegraph. Messages can be sent en route.

Airfreight Forwarders Form Permanent Group

The Airfreight Forwarder Association, created as a temporary organization last winter (AVIATION NEWS, Feb. 24), has been established on a permanent basis and has moved to strengthen its ties with uncertificated all-cargo airlines.

Meeting in Washington recently, AFA named a new slate of officers and appointed an executive committee to ask CAB for immediate issuance of temporary authority permitting selected independent airfreight forwarders (not connected with surface interests) to operate as indirect common carriers. AFA contends that CAB can determine which companies are qualified for the temporary authority from the record of the Board's current airfreight forwarder hearing.

Representatives of four members of the Independent Airfreight Association—Slick Airways, U. S. Airlines, California Eastern Airways and the Flying Tiger Line—met with the forwarders and assured them of their support. New AFA officers: Allen Dean, National Airfreight Forwarders, Detroit, president; A. N. Wiley, Air Express International, New York, first vice president; W. L. Thompson, Mercury Airfreight Corp., Los Angeles, second vice president; F. V. Gandola, Airborne Coordinators, Cleveland, secretary; and P. A. Bernacki, Peter A. Bernacki Co., Philadelphia, treasurer.

British Planning New Trunk Services to Orient

(McGraw-Hill World News)

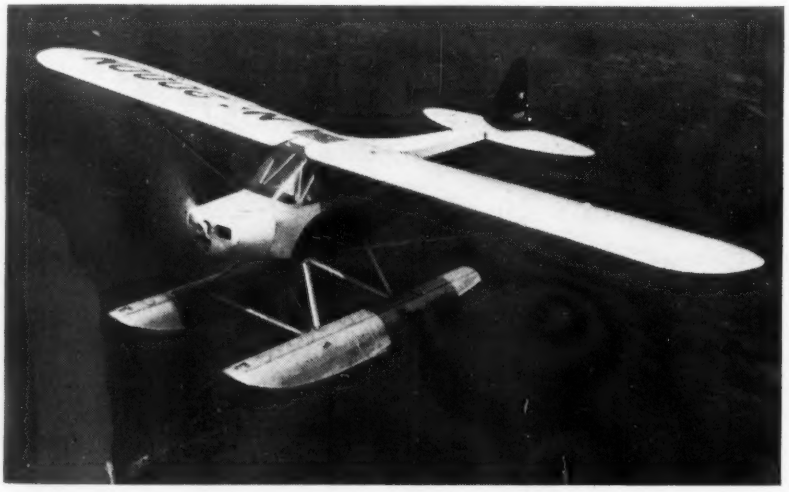
Melbourne—British experts are in Australia exchanging technical data with officials of the Commonwealth Department of Civil Aviation in a survey of trunk air route services between the U. K. and Japan and Australia.

The British Government hopes soon to extend its flying boat service past Hong Kong to Tokyo, and BOAC intends to start a new "South China Sea Circular Route" this year from Hong Kong to Manila, Borneo or Sarawak, Singapore, Bangkok, Hanoi and back to Hong Kong.

G. Warcup, head of the Overseas Airfield branch of the British Ministry of Civil Aviation said the Bristol Brabazon I probably will be reserved for the North Atlantic run with Tudor IIs used on the Australian route.

Autogiro Patents

Under a new licensing arrangement with the Autogiro Co. of America, United Aircraft Corp. acquires rights to use more than 200 Autogiro-held patents in general production of its Sikorsky helicopters. The wartime licensing agreement between the two companies covered only government procurement.



CUB SPECIAL FLOATPLANE

CAA approval has just been obtained on floatplane version of new 65-hp. Piper Cub Special PA-11 equipped with Edo Model 1400 all-metal floats. Performance of two-place tandem floatplane, with McCauley metal propeller includes a 360-fpm. rate of climb, 92-mph. top speed and 80-mph. cruising speed. Tests showed plane airborne in a 40 sec. water run, with 1350 lb. gross weight. Floats are of new simplified Edo design with retractable water rudder, padded bow bumpers, and other features for simplified field maintenance.

AAF Is Pondering New Bomber Rules

New heavy, long-range equipment calls for strategy re-evaluation.

Recent completion of the first production B-36 at the Consolidated Vultee Ft. Worth plant, and the fact that 99 sister ships are coming off the line at a planned rate of one a week, is being accompanied by a complete AAF re-evaluation of the bombing strategy which proved so successful in World War II, but which this very heavy, very long range bomber makes obsolete when it goes into service.

On short range missions the six-engine B-36 can carry 72,000 lbs. of bombs, but still more important, it can carry 10,000 lbs. of bombs, or an atomic bomb for a strike 4,000 miles from home, with enough gas for a trip home.

Commanding Gen. Roger Ramey of the Eighth Air Force, which will be the first force to be equipped with a B-36s, points out that the U. S. is already equipped with a few atomic bomb groups, and that with B-36s to carry the atom bombs, a retaliatory strike against an aggressive act will be made possible that would be "terrible to contemplate."

General Ramey forecasts the following trends in bombing strategy with the advent of the B-36 to service:

▶ **Need for advanced bases** with huge amounts of waterborne supplies, and island hopping advances using carrier forces with short range planes in enemy waters largely will be eliminated, since the long-range bombers can strike from the North American continent, anywhere in "that part of the world where aggression against us could start."

▶ **The new bombers** will have enough range to make attacks by indirect approach, widely skirting expected zones of approach so that any aggressor nation expecting B-36 retaliation would have to maintain a warning net around its entire boundary, an almost impossible task.

▶ **With present power,** B-36 top speed is quoted at over 300 mph. at 30,000 ft. and it is estimated that use of turbo-jet engines in the B-36 would raise this speed to around 400 mph., near critical compressibility for its structure. Successful fighter attackers would have to have 25 percent more speed, which would put them up in the critical compressibility regions. Until new fighter tactics are evolved, the faster bombers will be safer from fighters than were the World War II bombers.

▶ **Defensive armament** of the B-36 will include eight turrets each with two 20 mm. cannon plus high-speed "parasite" fighters carried by the bombers. (McDonnell Aircraft's XP-85, previously described and sketched in AVIATION NEWS. These tiny jet fighters will be dropped by the big planes in the event of attack, and are designed to be picked up again by the mother planes at the end of combat. The parasites are needed because the very long range of the B-36 precluded the use of escort fighters.)

▶ **The AAF is not discounting** the role of guided missiles and proximity fuses in the next war. Radar counter measures against such weapons must be considered. But General Ramey does not consider that the B-36 has been obsoleted by "push-button warfare." Until further development of push-button warfare, he expects the B-36, the B-50, and other aircraft now getting into the air will comprise the principal U. S. striking force.

▶ **There is no place** in the world that can't be bombed by the B-36 if shuttle bombing technique is used.

▶ **Value of the B-36** and other new bombers depends on their availability in quantity when any nation first attacks us.

NEWEST CORSAIR

First photo of Vought F4U-5 Corsair, now in production for Navy. Only outward appearance change from predecessor F4U-4 is two air intake grills on lower leading edge of cowl, replacing single one at bottom of earlier models. Extensive changes have been made within fuselage, including completely new cockpit interior. Powered by new P & W R-2800-E engine turning new Hamilton Standard prop, craft is called "fastest, most powerful propeller-driven single engine fighter in world."

Nearly 1/3 U. S. Planes Surplus Sold by WAA

Nearly one-third of all planes registered in the U. S. are surplus aircraft disposed of by War Assets Administration, which in a little more than two years has practically sold out of airplanes. Of approximately 65,000 planes turned over to WAA, about 35,000 have been sold for civilian use, with the balance sold for scrap.

Reported acquisition cost of the $65,000 planes was more than $5,000,000,000. On planes sold for civilian use, return to the Government was about 8 percent. The 30,000 planes sold for scrap yielded an average of 1½ cents a pound.

Planes sold civilian use by WAA: liaison, 3,775; utility cargo, 900; light transports, 2,900; medium transports, 1,300; heavy transports, 450; primary trainers, 11,915; basic trainers, 8,670; advanced trainers, 4,775. WAA's surplus plane stock now consists of about 625 C-46's, plus 200 DC-3's and DC-4's on lease to airlines.

Airport Aid Offers Made to Nine Cities

CAA's Federal-aid airport program, after getting off to a slow start with the first grant-in-aid offered to Twin Falls, Idaho, a year after passage of the act, by last week had offers of grants-in-aid out to nine cities, and was ready to go with a batch more.

Largest offer yet is to Chicago, $879,000 for the Class I downtown airpark on Northerly Island. The city will put up an equal amount. CAA stated the high cost for such a small field is due to the filling, and erection of bulkheads necessary to construct the field.

Other projects on which CAA has offered grants-in-aid:

- **Butler, Ga.**—Federal, $1,250, sponsor, $3,750; acquire land; Class II.
- **Camilla, Ga.**—Federal, $18,500, sponsor, $24,700; acquire land, construct Class II field.
- **Plainview, Tex.**—Federal, $75,000, sponsor, $75,000; pave runway, taxiway, aprons, construct administration building; Class II.
- **Green Bay, Wisc.**—Federal, $522,000, sponsor, $475,000; construct Class III field.
- **Harrisburg, Pa.**—Federal, $225,063, sponsor, $300,000; expand administration building, and other work; Class III field.
- **Bastrop, La.**—Federal, $76,765, sponsor, $72,538; acquire land, construct Class I field with two strips.
- **Anadarko, Okla.**—Federal, $18,088, sponsor, $52,140; acquire land, improve Class I field to Class II.

Industry Personnel Changes Reported

Continental Motors Corp. elected Thura Engstrom vice-president and factory manager of the Muskegon Division. He steps up from acting factory manager, after a 27-year career with Continental.

In other personnel actions:

▶ **Stewart-Warner Corp.** announced resignation of Lynn A. Williams, Jr., as vice-president in charge of the South Wind Division, manufacturer of aircraft heating systems. E. A. Hiter, senior vice-president, takes over supervision of the Division in addition to his other duties.

▶ **Republic Aviation Corp.** named Dickson Mullin Seabee factory representative for the West Coast. His aviation background includes affiliation with Beech Aircraft as service test pilot and with Taylorcraft as factory representative. He served as a Navy fighter pilot during the war.

▶ **Curtiss-Wright Corp.'s** Airplane Division at Columbus appointed J. E. Winchester to the engineering sales staff. He formerly was chief engineer of Slick Airways.

▶ **Pacific Division,** Bendix Aviation Corp. named R. C. Fuller assistant general manager, succeeding Mel Burns who resigned. Fuller has been general manager of Bendix West Coast. He formerly was sales manager of Pacific Division.

▶ **Aluminum Co. of America** announced retirement of George J. Stanley, vice-president and general sales manager. He will be succeeded by Ralph V. Davies, who has been an assistant general sales manager and who now will be a vice-president. Two other assistant general sales managers, Robert B. McKee and Donovan Wilmot, have also been promoted to vice-presidencies.

▶ **Boeing Aircraft Co.** named Norman Allen an assistant to the president to succeed O. W. Tupper, who has resigned. Allen, no relation to Boeing's president, William M. Allen, has been office manager of the accounting division.

▶ **Sherman Fairchild & Associates** appointed Martin V. Kiebert, Jr., a member of the firm. A radio and communications engineer, Kiebert will be a consultant to clients on aircraft telemetering, instrumentation, stabilization, servo mechanisms and remote control.

Aerial Fire Patrol

Marking the first time in the nation that air patrol actually will supplant large crews in a high fire danger area, use of planes in forest fire detection work on the Coeur D'Alene National Forest in Idaho will be inaugurated this summer, reducing about two-thirds the number of lookouts generally used during the fire season. The air arm will give the first 100 percent coverage compared to 69 percent previously.

Army Buys Lightplanes

Off-the-shelf purchases by the U. S. Army of two- and four-place civilian planes for Army Ground Force uses of liaison, communication and personnel transport, resulted in two contracts:

North American Aviation, Inc., Inglewood, Cal., for 62 four-place Navions, 30% spare parts, technical data, $510,962.

Aeronca Aircraft Corp., Middleton, Ohio, for 439 two-place Champions, standard except for Plexiglas roof and 85-hp. fuel injection Continental engine, $1,649 per plane plus 30% spare parts and technical information.

Navions are standard except for radio installation, jettisonable door and a few minor installations.

Both planes were demonstrated at Ft. Bragg, N. C., in competition with other "stock model" lightplanes in rough field landings and takeoffs simulating combat conditions. Planes were chosen on a basis of lowest bids of planes meeting the minimum requirements.

WAA to Liquidate Surplus Components

A program planned to liquidate all remaining surplus aircraft components by July 1948, with the 75 agents in the industry playing a major part, has been announced by War Assets Administration. Tentative target dates of Sept. 1 and Dec. 1 have been set for closing the sales-storage depots at Torrance, Cal., and Cleveland, respectively.

As of May, latest month for which figures are available, aircraft components originally costing $167,586,600 had been sold for $61,046,000, with agents accounting for material with an original cost of $66,317,718. This leaves in stock components that cost the government $775,329,000.

Inventories now in the hands of WAA agents will be screened, beginning immediately, and material segregated into three categories: as scrap; slow-moving or doubtful items, and saleable merchandise. Agents will be directed to sell the material in the first two categories at once under competitive bids, with supervision exercised by the regional chiefs of WAA's Aircraft and Electronics Division.

The balance of the inventory, classed as saleable, will be offered to the agent at cash. He can either obtain outside financing, or WAA will extend credit over a period not exceeding three years. If the agent turns down the offer, the inventory will be disposed of by competitive bid.

WAA's present arrangement with agents is to ship merchandise on consignment, with the government paying shipping costs. It is expected that by Oct. 1, agents will have inspected all surplus aeronautical material and filed their requisitions with WAA. Agents filing requisitions after Oct. 1 will pay shipping costs on the material. Under present plant, WAA will stop making allocations to agents on Jan. 1, 1948.

John H. Carey, WAA deputy administrator for aircraft and electronics disposal, said that if the speed-up policies and procedures are followed without major deviations, WAA "will be entirely out of the aircraft components parts business before July 1, 1948."

FLYING SADDLE BAGS

Bell Aircraft's special airmail helicopter, apparently an adaptation of the Model 47, with mail compartments on both sides of the fuselage. Each compartment has hooks for mail bags and capacity of the two together is about 500 lb. of mail. The "Airmailer," as Bell calls the new model, comes with open or enclosed cockpit.

British Turbine Craft Several Years Away

Jet expert claims eventual airline replacement of piston engine.

At least five years will elapse before British prototype turbine-powered aircraft will fly the air routes, F. R. Banks, widely known engine authority, told a meeting of engineers in New York.

A wartime air commodore and director of engine development, now director of Power Jets (R & D) Ltd., Banks outlined the British viewpoint on future aircraft propulsion before a joint meeting of the Society of Automotive Engineers, Institute of the Aeronautical Sciences, and American Society of Mechanical Engineers.

▶ **Piston Engine End Forecast**—Holding that even after this five year period some additional years will be required to accumulate sufficient numbers of turbine-driven craft and operating experience, his incidental forecast is that the termination of the overall period—about ten years hence—will mark the end of the high duty reciprocating aviation engine.

All future British plane projects—except for some small feeder or taxi types—will have turbojet or turboprop installations. Since no new piston engines are expected to be built by British manufacturers, ruled out is the probability of developing compound installations to attain increased power or fuel economy.

Any turbine-powered commercial-route flights, trans-Atlantic or even inter-city, before the lapse of five years will in all probability be purely experimental, without passengers.

▶ **Turboprop, Jet Uses**—Although British planning includes adoption of turbojet propulsion for both military and commercial craft, Banks disclosed that the turboprop is being developed mainly for airline operation. At present, more turboprop than turbojet units are coming off Britain's production lines.

Contrary to the popular conception of turbojet feasibility, he declared that this type of power would be used in short as well as long range craft, for example, in normal inter-city airline operation. Double the trips could be realized by halving present block-to-block times in cleanly designed craft incorporating considerable weight-saving. Ranges in excess of 3,000 mi. (4,000 in still air) are not foreseen for jet planes, and turboprops probably will be used for this purpose, although those presently under development in England are intended for planes of moderate range and altitude, with cruising speed of about 300 mph. It is believed that propeller efficiencies of 80 percent up to 550-mph. speeds could be attained in prop-turbine combinations.

▶ **Overhaul Periods Lengthened**—Present perfection of some British military turbojets enables overhaul periods to be stretched to 240 hr., with only an intervening visual inspection of the combustion chambers necessary at the 100-hr. mark. The 240-hr. achievement is attributed largely to even burning in the combustion chambers, thus avoiding earlier teardown necessitated by a "hot blade" caused by irregular burning.

It is felt that at least 300 hr. before overhaul should be attained before commercial jet operation is considered feasible.

▶ **Operating Problems**—Elimination of hazard to passengers will be an important factor in very high speed commercial turbine-craft flight, Banks said, even at 40,000 fts., "bumps" from rough air being a serious danger. This problem is far from solution.

Also, angle of descent of high speed craft would necessarily be flat, unless some air-braking means were employed. Pilot would have to start descent at a very low rate as soon as he had reached altitude—impractical for short trips. Reverse piping to deliver the jet stream in flight direction may permit a steeper glide path.

▶ **Speeds and Fuels**—It is expected to be about seven years before jet craft will consistently fly at speeds approximating mach .85 (about 650 mph. at sea level). Present safeguards and airport facilities probably must be refined before this high speed operation is feasible.

Research remains to be done also in the development of fuel for commercial turbine-powered craft. Less volatile fuels than the present military types will be dictated by safety consideration. Presently available "non-flammable" fuel oil freezes at about 0 deg. C., whereas for commercial craft operation a freezing temperature of about minus 40 deg. C. would be required.

Export Subsidiary

United Aircraft Corp. has organized a subsidiary, United Aircraft Export Corp., to handle foreign sales of all four United divisions, Pratt & Whitney, Hamilton Standard, Chance Vought and Sikorsky. The Export Corporation began operations last week with the discontinuance of United's Export Department.

Joseph M. Barr, who has been manager of the Export Department since 1944, has been elected president of the new corporation. Vice-president is E. K. Hubbard II; treasurer is James J. O'Shea; secretary is Paul Becker. Main offices of the corporation will be at the parent company's offices in East Hartford.

Mosquito Produced In 3 New Versions

(*Mc-Graw-Hill World News*)

London—Three new versions of the famed Mosquito and two new variants of the Hornet have been disclosed by De Havilland Aircraft Co. Ltd.

The Mosquito, one of a very few types of British warplanes still being made, has added three more variants. The Mark 37 Sea Mosquito replaces the Mark 33, which was the first twin-engined aircraft to operate regularly from carriers, and has a new type of radar scanner in its nose. So has the new Mark 38 night fighter. Both retain performance of their predecessors.

A departure is the Mark 39, adapted for target-towing, which carries a crew of three for its specialized function. Besides towing targets, the plane can be operated as a live target, at which other gunners may fire with live ammunition but with sights which have been given a fixed deflection. The bursts are recorded on film by a camerman carried in the extended transparent nose of the target aircraft.

The two new Hornets are the Mark 3 long-range fighter, which has been given greater fuel capacity than the Mark 1, and the Mark 21 night-fighter Sea Hornet which incorporates a second cockpit for a navigator-radar operator behind the pilot's. This plane can be used alternatively for reconnaissance or for strike-navigator as leader of a formation of single-seat Hornets.

Fox Moth Price Reduced

The price of the De Havilland Fox Moth made by De Havilland Aircraft of Canada, has been reduced $1,000 to $5,450 as the result of improved manufacturing efficiency. The company reports that the Fox Moth landplane can now be changed over to a seaplane on 24 hours notice due to an increase of the stock of floats.

Canadian Tax Lifted

Canada's 15 percent travel tax has been removed from air services to those remote parts of the Dominion which have no practical means of surface transportation. The exemption is designed primarily to assist mining men and others traveling on business to the sparsely settled northern areas.

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NACA Reveals New Results Of Supersonic Research Program

First full year effort on basic high speed problems indicates new design concepts and construction methods necessary; flight tests to begin in July.

By ROBERT HOTZ

The shape of supersonic things to come is now more distinct as a result of recently revealed data gathered in the first full year of basic high speed research by the National Advisory Committee for Aeronautics. NACA's return to basic research in spearheading the United States' effort to achieve supersonic flight marks a clean break with its wartime policy of concentrating on improving designs and tactical type aircraft already in existence.

Importance of this fundamental research program is indicated by the $12,000,000 increase of NACA's 1948 budget by an economy minded Congress that has drastically slashed funds for virtually every other government agency seeking an appropriation. NACA will get $43,449,000 for 1948, the bulk of which will be spent on supersonic research. The fiscal year just concluded saw NACA spend $30,713,000 primarily on the research program that has yielded the first usable data on the critical transonic range.

▶ **Tardy Entrance**—Although NACA and the United States made a tardy entrance into the supersonic research race, there is evidence that in the last year some of the other competitors have been unable to match the NACA pace.

Facilities now under construction indicate that this gap may be widened considerably during the coming year. Although the joint AAF–NAVY, NACA, JRDB plan for a billion dollar supersonic research center has been shelved in view of the chill economy winds blowing from Capitol Hill, work is well underway on a 6x8 ft. supersonic tunnel at Cleveland; a 4x6 supersonic tunnel at Langley and another freon gas free flight supersonic tunnel at Ames. The 16 ft. wind tunnel at Langley is being stepped up to 60,000 hp. to bring it up to transonic speeds.

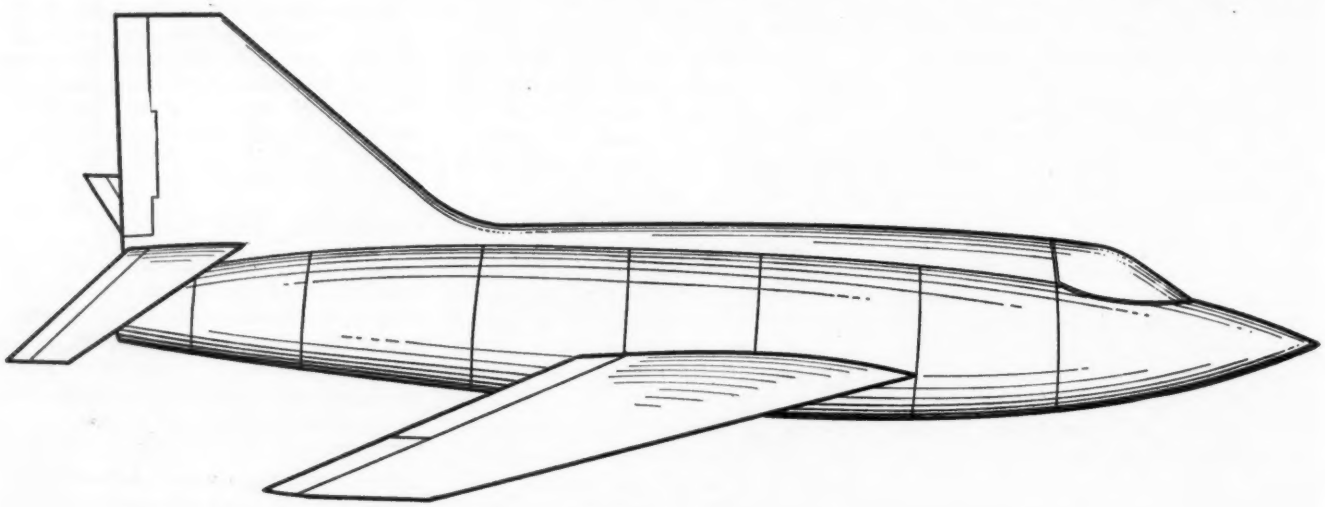
▶ **New Tests to Begin**—The NACA supersonic research has been conducted by three methods—wind tunnels including a free flight tunnel filled with freon gas that permits speeds up to Mach 4; rocket powered, remotely controlled free flight scale models and wing flow tests in which models are mounted at the point of fastest air flow on P-51 wings so that they experience transonic air flow while the aircraft to which they are attached is still flying at subsonic speeds. A fourth method—flight tests of full scale piloted research aircraft—will begin this month.

Indications are strong that some form of swept back wings will be required to negotiate the turbulent reaches of the transonic range. Indications are equally strong that once transonic control and stability problems are well in hand there will be a return to straight edge wings on aircraft designed primarily for supersonic speeds. Although the bulk of NACA wind tunnel and flight research has been concerned with characteristics of swept back wings, the Ackeret wing and other thin, straight edge types are now under investigation at supersonic speeds.

▶ **Wing Plan Problems**—Biggest problem with wing plan forms seems to be the fact that supersonic aircraft will have to be able to negotiate sub and transonic ranges before and after it operates at supersonic speeds. Intense effort is now being devoted to improving lift and stall characteristics of various types of wings that have demonstrated efficiency at high speeds but lack stability and make control difficult at subsonic speeds required for take-off and landing. Application of boundry layer air flow control through suction slots in the wings and use of various types of leading edge wing flaps and combinations of wing slots, vanes and spoilers are being investigated to improve low speed lift of high speed wings.

All possible wing plans have been investigated—various degrees of sweepback up to 85 percent; sweep forward; combination of forward and backward sweep on the same aircraft; triangular Delta wings and the trapezoidal shapes of the Ackeret type wing. Preliminary conclusions indicated better low speed performance from swept forward wings but that plan form was discarded when it became apparent that the high speed problems of swept forward wings would be more difficult than the low speed problems of swept back wings.

Delta wings with sweepback of less than



FIRST ILLUSTRATION OF BELL'S XS-2 TRANSONIC RESEARCH PLANE

Designed to explore stability and control problems between Mach number .85 and 1.1, craft has theoretical speed range up to Mach 2.5. Differing radically from XS-1, first high speed research craft, XS-2 has sweptback wings with negative dihedral; circular arc air foil; and sweptback tail surfaces. Like XS-1, it is rocket powered.

Teaming up on TIMKEN BEARINGS

Showing the latest technique in amphibious assault is the XHRP-1 helicopter built by the Piasecki Helicopter Corporation, Sharon Hill, Penna., as it lifts a "Jeep" made by Willys-Overland Motors, Inc., of Toledo, O., vertically and carries it to a predetermined destination.

Nicknamed "The Flying Work Horse", this aircraft can cruise at a good 100 miles an hour carrying a load of more than a ton.

To help achieve this remarkable performance, 32 Timken Tapered Roller Bearings were installed in the fore and aft transmission, rotor blades, landing-wheel swivels and landing wheels, where they reduce friction, conserve power and carry all the radial, thrust and combined loads imposed upon them under all takeoff, flight and landing conditions.

The "Jeep", of course, has long been equipped with Timken Bearings, using 22 of them in the front and rear axles and the transfer case.

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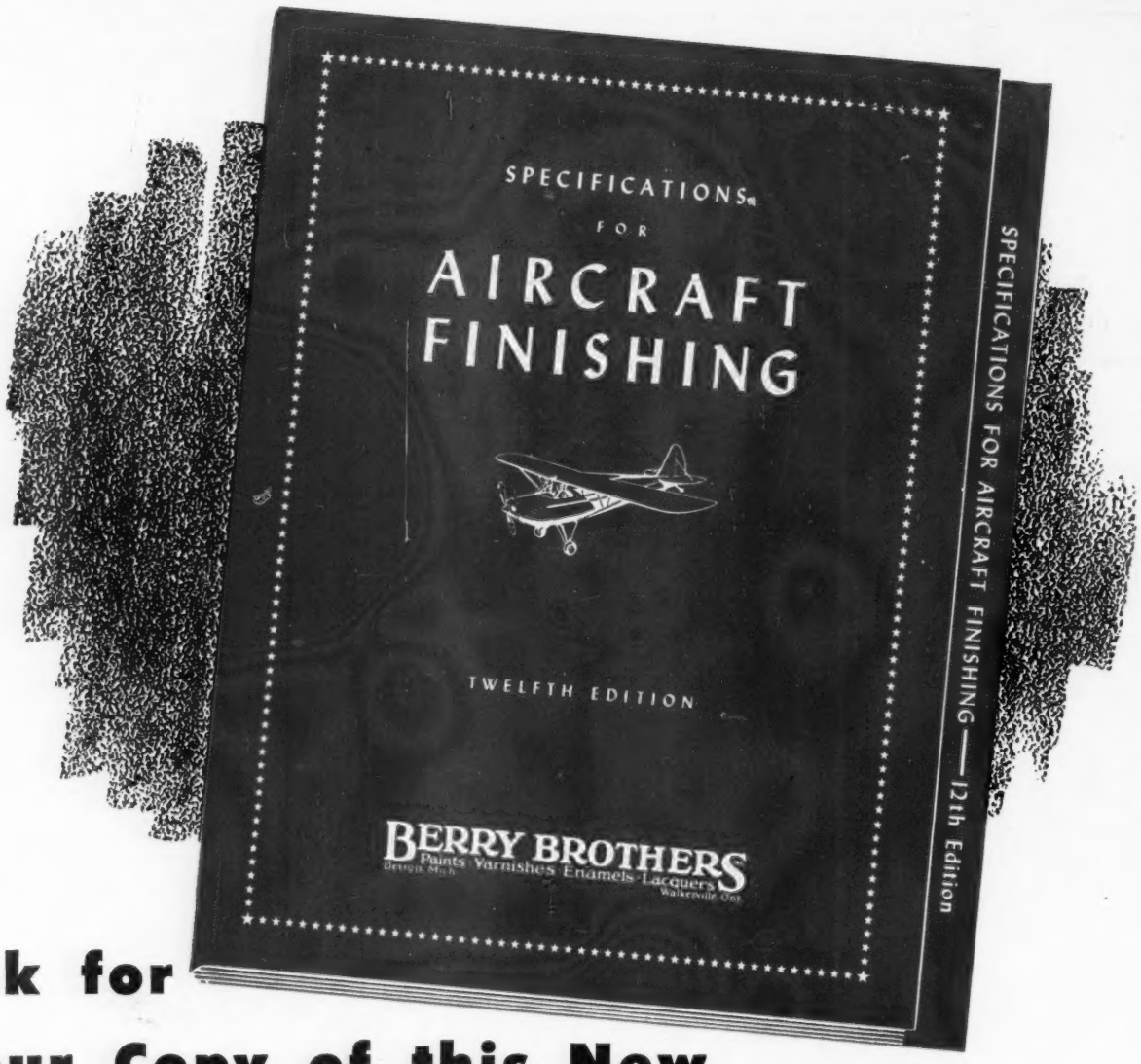

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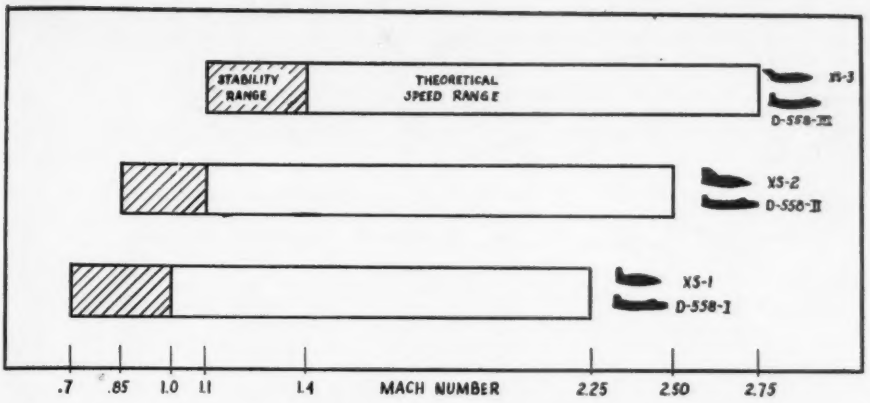

NACA'S 3-PHASE FLIGHT RESEARCH PROGRAM

Chart showing how NACA flight research program is planned to explore transonic zone to acquire stability and control data necessary for supersonic flight. Research will be conducted in three phases with two types of aircraft, one with rocket power, the other with turbojet power. Ranges of each pair of research planes will overlap to insure complete coverage of transonic zone where stability and control are critical problems.

65 degrees exhibited good high speed flight characteristic but with from 65 to 83 degrees sweepback, severe instability develops. At 83 degrees of sweepback the model, which looks very much like the folded paper airplanes that schoolboys make, rolled over and over. Although the Germans did considerable work with Delta wings they were never able to control them in flight or landing and take-off. NACA has successfully flown and controlled a model with 63 degrees sweepback and aspect ratio of two in its free flight tunnel at Langley Field. Landings and take-offs are made at a 30 degree angle.

▶ **Sweepback Effects**—Other effects of swept back wings include alleviation of gust loads by 40 percent with a 45 degree sweepback, an important factor in design of high speed transports; better spin recovery, and a bad tendency toward tip stall. Spinning characteristic of high speed planes seem to be universally bad in their present form due to the fact that the bulk of the aircraft load must be carried along the fuselage. High speed wings are too thin to carry fuel and armament loads as they do in conventional fighters. Spin tests on all high speed jet fighters from the P-80 through XF6U revealed unstable spin characteristics with the XF6U tumbling into an inverted spin after several turns.

The tip stall problem is being attacked by experiments with small vanes on the leading edge of wings to block the outward flow of the boundary layer air. Increased stability has been obtained by setting the wings at a 5 degree angle above the normal flight path of the aircraft.

▶ **Airfoil Types**—Three types of airfoils have been under intensive study in the high speed research program. One is NACA's own high speed airfoil series. The other two are the double wedge or diamond shaped airfoil and the circular arc. The circular arc is a modification of the diamond shaped airfoil in which both upper and lower surfaces of the airfoil are equal segments of an arc of the same circle. The Bell XS-2 will use a circular arc airfoil. It was originally planned to give the double wedge airfoil its initial flight test on the Douglas XS-3.

Experiments with various types of swept-back propellors have indicated that there is little hope at present for these types of propellors to equal the efficiency of jet power above 500 mph. A needle nose diffuser for jet air intakes on high speed aircraft has been developed to minimize turbulence from shock waves in the air intake. This type of nose seems particularly good for military aircraft since it permits mounting of guns and radar equipment in the nose diffuser.

▶ **Flight Tests**—The research flight test program, which began with a pair of specially modified Bell P-39's with swept back wings exploring landing and take-off problems of this type wing, will begin exploration of the transonic zone in piloted aircraft this month as NACA takes delivery on the XS-1. An AAF contract with Bell Aircraft Corp. to do high speed testing of the XS-1 still is pending but indications are that AAF probably will do the testing with military pilots to save money. Flight test program is to be conducted in three phases with one XS model and one D-558 type in each phase.

NACA technicians are altering the XS-1 instruments preparatory to flight. The D-558 Mark I is still being readied for acceptance tests by Douglas test pilot Gene May. Landing gear performance is still not completely satisfactory.

▶ **Lower Fringes**—First phase to be done by the XS-1 and the D-558 Mark I will explore the lower fringes of the transonic zone. Phase Two involves the Bell XS-2 and the D-558 Mark II both with swept back wings and lower aspect ratios than first phase planes. Douglas will build both third phase planes—the D-558 Mark III which will have extremely low aspect ratio stub wings and the XS-3 for which a design contract was given to Douglas last week. Phase Two will explore through the transonic zone into the fringes of the supersonic while Phase Three will be primarily supersonic. The Northrop XS-4 is designed principally to explore characteristics of tailless aircraft at high subsonic speeds.

According to Milton Ames, NACA Coordinator of Aerodynamic Research, the NACA flight test program for Phase One will take at least six months.

Helicopter Testing Towers Stress Blades

NACA and British research facilities offer hope for new study in rotary wing research

Rapid strides in helicopter design and development progress may be made possible by special helicopter testing towers now being perfected in both the U. S. and England.

Although the two towers vary widely in purpose and detail design, they are built on similar principles. Both will permit the testing of helicopter rotors out of range of "ground effect," which, because of the air moving down through the rotor and rebounding from the earth, produces complex airflow patterns. These patterns greatly impair data obtained in actual helicopter flight tests.

▶ **Langley Tower**—The U. S. tower was designed and built by the National Advisory Committee for Aeronautics at its Langley, Va., laboratory to perform fundamental research on helicopter rotor aerodynamics in order to simplify complex mathematical theories presently employed.

The tower, recently taken off the top secret list, has been in operation since October, 1946, stands 40 ft. high and is powered by a 1,500 hp. Packard marine engine, geared to turn the rotor at from 80 to 400 rpm., well above and below normal operating range of conventional helicopters.

The drive shaft is instrumented to provide data on thrust, torque, side force, pitch angle, cyclic pitch, drag angle, coning angle and vibration.

▶ **Use Winds**—The tower is located in a clear area permitting the use of ground winds of up to 20 mph. as a useful research condition. A special research use of the tower is the measurement of lift and the power required in a rotor at high tip speeds and angles of attack near stalling, which cannot be safely measured in flight tests of helicopters.

The British tower is being built by the Bristol Aeroplane Co. as an experimental and development unit for the testing of specific rotor designs for projected Bristol helicopters. As such it is far less elaborate and scientifically useful than the U. S. tower. The Bristol tower is 50 ft. high and is powered by 500-volt d. c. electric motor capable of producing 1,000 hp. at a motor speed of 700 rpm. To permit rotors to be tested to destruction, the tower is surrounded by a heavy torpedo safety net supported by nine heavy girders.

The tower is flexibly mounted and supported by six guy-ropes anchored into concrete foundations.

▶ **Tower Oscillation**—Purpose of this system is to impart to the rotor the same highly undesirable oscillations found in present helicopters, thereby providing a more accurate set of test conditions during operation of the tower. Slackening of the ropes will permit the tower to oscillate in harmony with any one of many frequencies, most of which must be damped out by fast and accurate manipulation of the various rope tensions.

New Canadair Four Is Hybrid DC-4, DC-6

Company expects successor to DC-4M-1 to fly soon, with first deliveries due in August.

Canada's newest bid for the Empire transport market, a 40-passenger DC-4, C-54 and DC-6 hybrid powered by improved Rolls-Royce British engines, is scheduled to take the air for the first time shortly under the designation DC-4M-4, Canadair Four.

Produced by Canadair Ltd., of Montreal, the plane is the successor to the DC-4M-1, a conventional DC-4 with Rolls-Royce Merlin engines. Initial deliveries are being promised for August, with full-scale output expected by November. Only announced customer at the moment is Trans-Canada Air Lines, now flying six DC-4M-1 planes originally built for Royal Canadian Air Force and loaned to TCA.

► **TCA Transport**—TCA's permanent long-range transport will be the Canadair Four, built with a shrewd blending of U. S. and British design features and knowledge calculated to appeal to other members of the British Commonwealth.

Canadair Ltd. was built and operated during the war by the Canadian Government, which a few months ago sold the plant to the Electric Boat Co., a U. S. manufacturer. While still owned by the Government, Canadair entered into a licensing agreement with Douglas Aircraft Co., under which the Canadian firm may build Douglas-type planes for sale in Canada and the United Kingdom. It will have to obtain special permission from Douglas to sell elsewhere.

► **Export Problem**—It is possible to foresee a set of circumstances under which Douglas would grant that permission should an Empire country state it would buy the Canadair Four, but not a U. S.-made Douglas. It is highly unlikely that the U. S. firm would refuse permission for the sale. The possibility of that situation arising is increased by close Empire trade relations and the dollar shortage prevalent in all countries.

Whether export considerations have entered into Canadair's calculations or not, the company is emphasizing the fact that content of the Canadair Four is 50 percent British Empire. A large part of this undoubtedly is the engine installation.

► **Rolls-Royce Engines**—Engines are Rolls-Royce Merlin 620's with .42 reduction gear. They drive Curtiss Electric three-bladed, full feathering reversible-pitch propellers. These engines are rated slightly lower than the 620's used in the DC-4M-1 which utilized a .471 reduction gear to drive four-bladed Hamilton Standard Hydromatic props.

With the 620 engines, rated at both take-off and for normal use considerably below the Pratt & Whitney R-2800 engines in the DC-6, Canadair claims a higher useful load and higher cruising speed than specified for the DC-6. The reason lies in the more or less familiar claim that a liquid-cooled engine can operate continuously much closer to maximum normal rating than can a higher-powered air-cooled engine.

► **80,000 Lb. Gross.**—The Canadair Four has a gross take-off weight of 80,000 lb. as against 81,462 lb. for the DC-6. Manufacturer's weight empty of the Canadair Four is 45,456 lb., leaving a useful load of 34,544. DC-6 manufacturer's weight empty is 48,151, and useful load 33,311. (DC-6 can operate at both higher useful load and maximum weight.)

The 620 Merlins are rated for take-off at 1,725 hp., against a dry rating of 2,100 hp. for the R-2800, or a wet rating of 2,400 hp. at take-off. Normal rating of the Merlins is 1,285 hp., and for the R-2800, 1,800 hp. Using maximum cruise power of 1,160 hp. per engine, the Canadair Four has a claimed speed at 23,000 ft. of 317 mph. At maximum cruise power, the DC-6 at 19,000 ft. and 84,000 lb. gross has a speed of 301 mph. At 60 percent of maximum continuous power, about 1,100 hp., the DC-6 at 23,000 ft. and 81,500 lb. gross weight has a speed of 300 mph.

► **Engine Plan**—Apparent plan of the Canadair Four's builders is to make it possible to operate the airplane at the maximum cruise power of 1,160 hp. per engine, about 90 percent of normal rated power, thus achieving the speed specified. Working in their favor is wartime experience indicating it is possible to operate liquid-cooled engines at near maximum power for extended periods of time, and the fact that the DC-4M-4 engines are so much lighter than the DC-6 engines.

Briefing Production News

► **Northrop Aircraft, Inc.** reports net sales of $8,063,111 for the period ending April 30, the third quarter of its fiscal year. Net sales for the nine months of the fiscal year total $24,641,278.

► **Boeing Aircraft Co.** has signed final papers with AAF terminating its B-29 production program, six years after the initial contract was granted. As amended, this called for 6,289 B-29's, of which 2,763 plus spares, were completed.

► **Curtiss-Wright Corp.'s** Airplane Division at Columbus has begun deliveries of the 10 modified B-17's for AAF ditching experiments which have begun off the Florida coast. Planes are radio-controlled, with special cameras recording results.

► **Bell Aircraft Corp.,** scheduled to shutdown for a two-week plant-wide vacation beginning July 26, is urging shippers not to send materials which will arrive after July 22. Bell has delivered more than 80 helicopters since the first of the year, according to Secretary Leston P. Faneuf.

► **Minneapolis-Honeywell Regulator Co.** has opened a southwest district office in Fort Worth for its Aeronautical Division, with Claude H. Smith in charge. M-H also has established a Mexican subsidiary, Honeywell-Brown, S. A., with headquarters in Mexico City on Calle De Ramon Guzman. Manager is Virgil H. Hiermeier.

► **Boeing Airplane Co.'s** Wichita division is at work on a new Navy contract for $400,000 worth of spare parts for N2S Kaydet trainers.

► **United Aircraft Corp.** has signed a new licensing agreement with Autogiro Co. of America under which it acquires the privilege of using more than 200 patents in all its production of Sikorsky Helicopters. United had a wartime license which covered only government procurement.

► **Curtiss-Wright Corp.'s** Propeller Division has bought from War Assets Adminsitration a 19-acre plant containing 220,000 sq. ft. of floor space. The new plant, adjacent to the main facility at Caldwell, N. J., cost C-W $2,900,000 and gives the Propeller Division a total of 750,000 sq. ft. The Division has signed a new contract with its I. A. M. union for a wage increase of 8 cents an hour retroactive to May 15, 1947, and an additional 2 cents effective Dec. 1, covering 2,050 employees.

► **Glenn L. Martin Co.** has completed sufficient tooling for the modified wing and tail structure of the 2-0-2 to resume production upon receipt of CAA certification.

► **Fairchild Engine & Airplane Corp.'s** Duramold Division is closing its Jamestown, N. Y., plant and moving operations to the airplane plant at Hagerstown, Md., and the Pilotless Planes Division at Farmingdale, N. Y.

► **Allis-Chalmers Manufacturing Co.** has formed a new turbo-power development department which will deal chiefly with engines for ships, locomotives and stationary power plants. It is headed by R. C. Allen, former head of A-C's steam turbine work.

► **Brown Instrument Co.,** a subsidiary of Minneapolis-Honeywell, has announced it will stick to a firm price basis and that it has eliminated the labor-material escalator clause in its sales contracts.

► **E. I. Du Pont de Nemours & Co.** has trade marked the name "Strux" for its cellular cellulose acetate plastic used as a core in many laminated materials for aircraft purposes.

► **Pacific Airmotive Corp.** has moved into its new headquarters and overhaul base adjacent to Lockheed Air Terminal, Burbank, Calif. The $2,000,000 plant covers 180,000 sq. ft.

► **Breeze Corporations, Inc.** plants and offices will be closed July 28-Aug. 11 for vacations. Materials should not reach plants later than noon July 25, or before Aug. 11.

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Centrifugal-Type Blower Motor
27-v, d-c—.55 hp cont.
7500 rpm
Cabin Cooling Compressor Motor
27-v, d-c—9.24 hp cont.
3600 rpm
Cabin Ventilation Blower Motor
115-v, d-c—7.5 hp cont.
5800 rpm
Some representative motors from the complete Westinghouse line—for every type of aircraft application . . . for all electrical systems.

You'll find a drive for every flying job in the complete line of Westinghouse aircraft motors. The examples pictured are just a few to show you the range of applications covered . . . for every type of plane; for all standard distribution systems; for any power and speed.

Built to exacting specifications—and tested under actual flight conditions—these motors give you the proper combination of dependable performance and minimum weight. And they're backed by a competent engineering organization that can handle your specialized application with a motor custom-built for the job.

But aircraft motors are just one phase of the broad line of Westinghouse equipment for aviation, ranging from lamps for plane and airport lighting to electrical drives for supersonic wind tunnels. For a complete story of this service ask your nearest Westinghouse office for booklet B-3775. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-94754

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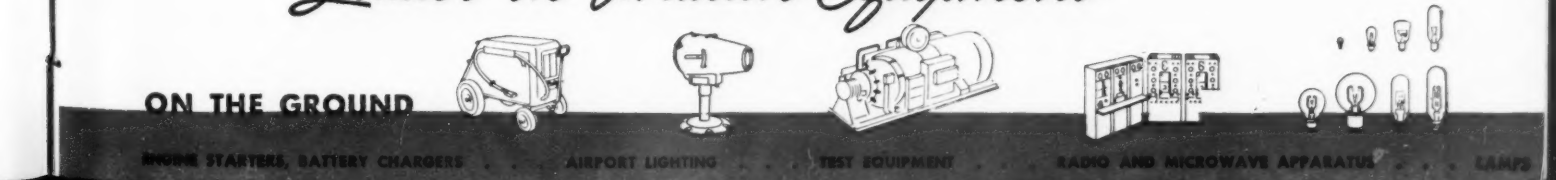
Leader in Aviation Equipment



ON THE GROUND

ENGINE STARTERS, BATTERY CHARGERS . . . AIRPORT LIGHTING . . . TEST EQUIPMENT . . . RADIO AND MICROWAVE APPARATUS . . . LAMPS

NEW! all-purpose STRONA aviation greases withstand heat, water, cold!

1. STRONA HT-1 and LT-1—the new *all-purpose* strontium base aviation greases—give complete protection at temperatures from 300°F. to −40°F.! That means maximum lubricant protection for aircraft parts in any kind of weather from the arctic to the tropics!

2. For example: in severe 10-month tests made by a leading world airline, transports flying regular schedules were lubricated on one side with STRONA greases and on the other side with various brands of aircraft greases. Parts lubricated with STRONA operated without grease change *7 times as long* as parts lubricated with ordinary greases.

3. STRONA greases can be used to lubricate up to 90% of the parts on transport aircraft—100% of the parts on light planes! The two grades of STRONA perform jobs which formerly required from 8 to 12 different greases! The Pacific-Alaskan Division of PAN AMERICAN WORLD AIRWAYS specifies STRONA for 85% of the total lubrication points of its DC-4 Clippers!

4. STRONA GREASES are now specified for use by leading plane manufacturers and airlines. Fixed base operators and private plane owners have found STRONA HT-1 and LT-1 the answer to safe, long-lasting lubrication. And all-purpose STRONA keeps lubricant inventory and maintenance costs at a minimum. Both grades are now available in quantity.

STRONA

Phone your local Union Oil Representative or wire Sales Dept., Union Oil Company, Los Angeles 14, California, for full information.

ANOTHER **UNION OIL** SUCCESS-TESTED PRODUCT

Admiral Rosendahl Heads Airship Study

$70,000,000 sought for operation of seven giant dirigibles on overseas passenger route.

By BLAINE STUBBLEFIELD

There's always a chance the U. S. will try commercial rigid airships while the indefatigable Rear Admiral C. E. Rosendahl (ret.) fights for it. Commanding a new drive, in civies and unmuzzled by the Navy, he's out for lighter-than-air as a desirable intermediate between fast airplanes and slow surface ships.

Three scores for his side from the outset: (1) Russian development of rigid airships which, among other things, are browsing in North Polar regions; (2) A report by the Air Coordinating Committee, which straddles but concludes ". . . the engineering and technical foundation for the construction of safe and successful lighter-than-air exists;" (3) Goodyear Aircraft Corporation is strongly supporting him, though it declines to be identified with any promotion.

The Rosendahl group is working on a three-way campaign:

► **First,** it has organized some private capital which is financing a serious study of technical and economic possibilities and risks. If the study is favorable, the capitalists will back a project and hope for government assistance.

This group's tentative aim is to pledge $70,000,000 for eventual construction and operation of seven 10,000,000 cu. ft. rigid airships, presumably on an overseas route.

► **Second,** they have approached the Presidential committee now studying rehabilitation of the Merchant Marine, with the hope that the contemplated act of Congress will authorize a subsidy program for lighter-than-air along with surface ships.

The Merchant Marine Act of 1936 directed the Commission to report on subsidies for airplanes and/or airships. Grover Loening made the study, reported favorably, and Congress by-passed it.

► **Third,** the Rosendahl group hopes to persuade some organization to set up a pilot operation with Navy K type surplus blimps, which can carry up to about 20 passengers, depending on modification, which would give the public and Congress a sample of "air yacht" travel and might lead to larger operations. Blimps have carried 400,000 passengers without an injury—a perfect safety record.

If Sea-Air Committee's drive for the right to use aircraft fails, as it seems likely to, shiplines may give serious attention to dirigibles. Some observers feel that CAB would not refuse them lighter-than-air rights, since the airlines have passed up the opportunity. CAB could be deprived of jurisdiction by an act of Congress authorizing subsidies under the Maritime Commission. Congress could establish a separate lighter-than-air commission, which the airshippers would like still better.

► **Report Gives Data**—The 39-page ACC report contains basic technical and economic data on the whole subject.

Industry Observer

► **McDonnell Aircraft's parasite fighter—XP-85—will be dropped with its wings folded from a B-36 bomb bay. Wings are supposed to unfold as the parasite falls clear of the mother plane. Recovery will be effected in the air by prewar dirigible technique. Mother planes will carry a combination of up to three parasite fighters and variable bomb loads.**

► New version of the British Nene jet engine will develop 5,750 lb. static thrust but U. S. engine manufacturers are not worried because domestic jets topping this power output are already in advanced stage of development.

► **Grumman's F9F, which will be powered by an earlier version of the Nene to be manufactured in this country by Pratt & Whitney, is nearing flight test stage. First F9F's, however, will be powered with imported engines.**

► Navy is having the same armament trouble with its first operational jet fighter — the McDonnell FD-1 — that bothered the AAF with early P-80's. Forward bulkheads have to be materially strengthened to avoid popping rivets when guns are fired.

► **Control of guided missiles over long ranges between launching ramps and targets is the subject of intense research now under way by push button warfare experts. Most promising lead seems to be automatic celestial navigation that guides the missile through automatic fixes on predetermined celestial bodies.**

► Observers who follow the trend of feeder lines closely wonder if the dearth of suitable planes for short haul operators may not stimulate Douglas to revive its prewar DC-5 for service as a feeder-liner.

► **Both TWA and Lockheed are reported to be unhappy about the $750,000 hull damage suit filed by the airline against the manufacturer as a result of the Constellation crash last summer at Reading, Pa. Strong indication is that TWA would not have filed suit without heavy pressure from its insurance agency, Aero Underwriters, which made original payment for hull loss damages. As a test case, the suit will require subrogation of any damages that may be won to Aero Underwriters. TWA's original claim against Lockheed for consequential damages covering loss of revenue during time Connies were grounded by CAB, were dropped during negotiations for cancellation of 18 model 649 Connies last winter.**

► When and if Menasco's giant new turbojet engine is perfected and made available commercially, Lockheed Aircraft Corp. will have a corner on its initial production. Lockheed holds an option for the first 250 engines Menasco produces which may give the Burbank firm a head start in the jet transport race. Lockheed management has indicated it will not absorb Menasco.

► **Howard Hughes paid tribute to the California weather by ordering erection of a 77,000 sq. ft. flameproof canvas tent over the Hughes flying boat at Long Beach harbor. It will be supported by a framework of 84 tons of tubular steel. Boat will not be launched before senatorial investigators headed by Michigan's Homer Ferguson arrive on the West Coast July 10 to probe Hughes' wartime activities, including his flying boat development contract.**

► Australian government has voted $3,136,000 for production of gas turbines by Commonwealth Aircraft Corp. in Melbourne. The firm will make Rolls-Royce Nenes under license.

► **Aircraft designers will be watching closely results of new University of California research on efficiency of pilots in prone positions. One hundred students, all former AAF and Navy pilots are acting as guinea pigs in the experiments which will probably require two years for completion.**

► Costs of NACA wind tunnel test models has skyrocketed from an average of $2,500 in 1940 to $20,000. Aircraft engine testing now costs about $747 per hr. in contrast to $16 in 1939 and $225 in 1943.

► **A flat surfaced "astral window" will replace the astrodome in the Boeing Stratocruiser. Flat surface is designed to withstand more stress than the bubble type dome, two of which blew out in Constellations on transatlantic crossings while using the cabin pressurization system.**

► Joint Army-Navy Board is conducting studies to discover the United States industrial bottlenecks most vulnerable to air attack.

Beech Releases Details and Photos of Feederliner

Beech Aircraft Corp. last week scheduled an early test flight for its unique Model 34 transport, designed to fit the purpose of almost any local service airline by provision for change-over from passenger to cargo space in a matter of minutes.

▶ **Estimated Performance**—Until the plane flies, Beech is sitting on estimated performances and many other details, except for takeoff distance—a strong selling point to local service operators. Preliminary estimates indicate it will take off, in accord with CAA regulations, with one engine dead and clear a 50-ft. obstacle within 2,600 ft. at sea level. At an elevation of 3,000 ft., the distance would be 3,100 ft. Although designed as a short-haul carrier, the Model 34 has fuel capacity for a maximum range of 1,400 mi., with a 45-min. reserve.

Model 34 is a high-wing monoplane with a modified V tail. The angle of the two surfaces on the transport is more acute than that of the tail of the Beech Bonanza, the four-place plane which made the first civilian use of this configuration. The powerplant also introduces features new to U. S. transports. The engines are buried, with four engines driving two propellers.

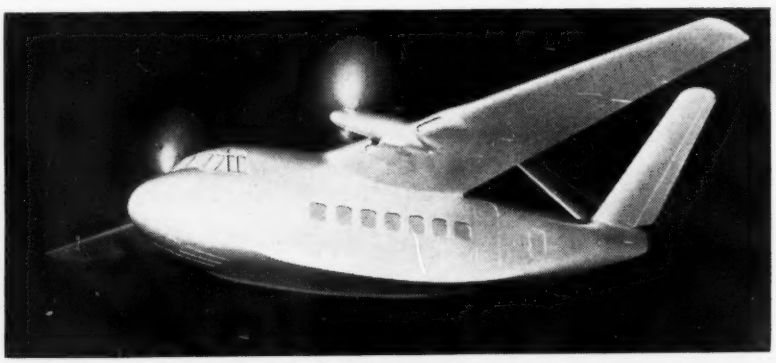
▶ **Lycoming Engine**—Beech calculations have been on the basis of using Lycoming S-580 engines, although recently it has started testing an unidentified Continental model. The Lycoming engine is normally rated at 320 hp., but develops up to 375 hp. at 3,400 rpm. for takeoff.

Fully supercharged, the Lycoming is a flat eight-cylinder engine which fits into the wing. The engines are arranged spanwise, driving the propellers through gears.

▶ **Seating Plan**—On the left-hand side of the cabin, looking forward, is a single row of four seats. On the right hand side, with no entrance door taking up space, there is a double row of five seats. At the front of the cabin, along each side, are seats for six more passengers, three on each side. Forward of these seats, beyond a bulkhead, is the cargo compartment.

Cargo compartment can be enlarged as needed by removing a seat at a time from each side. The bulkhead, complete with entrance door, is movable, so the cargo compartment can be segregated and hidden from the passengers' view in any one of the varying adjustments. After enlarging the cargo compartment, the interior of the airplane looks the same as before.

▶ **Folding Seats**—Main secret of Beech's variable interior are the seats. Beech engineers say they realize that the seats might be needed at a subsequent stop, so they must be carried in the airplane at all times. Therefore, they are arranged to fold up out of the way, with their front legs snapped into fasteners on the ceiling of the compartment. The folding operation for each pair of seats, it is claimed, takes about one min. Moving the bulkhead requires two additional min. All of this, according to Beech, can be done by one attendant. In five min., the company says, the entire forward space occupied by the six seats can be converted for cargo use.



Scale Model, Beech 34

With Cargo Bulkhead Forward, 20 Seats

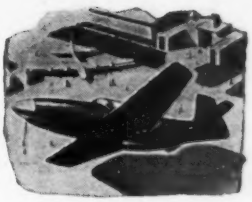
Cargo Bulkhead Moved Aft; 14 Seats. Note Baggage Lockers

PLAN NOW to come to Cleveland for a never-to-be-forgotten holiday—Saturday, Sunday, and Labor Day—with the marvelous, thrilling National Air Races as the big attraction.

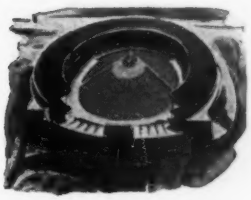
Greater than ever, this 21st Annual World's Premier Air Classic with jet propelled and supercharged planes competing with the speed of sound. Watch ships of strange design or a giant helicopter do things no bird can do. Breath-taking aerial acrobatics, spectacular formations and exciting competition of transcontinental or "pylon polishing" events maintain the fast tempo of entertainment, thrills and education.

Yes, education, for the eyes of the whole world of aviation watch what occurs at Cleveland! There is a serious side to these National Air Races, a prediction of things to come that can affect humanity everywhere.

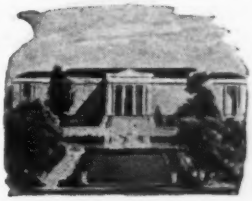
And there are many other things to see and do during your 3-day holiday in Cleveland. We can't tell you here about all the interesting facets of this great city of the midwest. But you can learn by writing the Cleveland Convention and Visitors Bureau, 511 Terminal Tower, Cleveland 13, Ohio, for a Free Booklet that presents Cleveland in words and pictures, telling you the things you want to know in planning your visit.



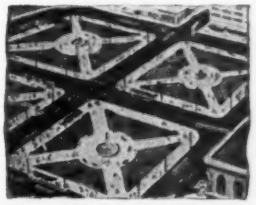
Cleveland's Municipal Airport, one of the largest and busiest in the world.



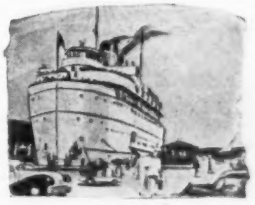
Cleveland Municipal Stadium, seen from the air. Seating capacity 80,000.



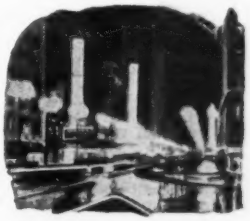
Cleveland Museum of Art with world famous collections.



View Cleveland from the 708 foot high observation floor of the Terminal Tower on the city's historic Public Square.



Enjoy Lake Erie with its many boat trips, bathing beaches and sights of great ore vessels and giant unloaders.



Playhouse Square at night. Amusement for thousands of theatre goers and night-clubbers.

This advertisement is run as an open invitation to come to Cleveland for a memorable holiday August 30, 31 and Sept. 1 by

THE THOMPSON TROPHY WORLD'S MOST FAMOUS AWARD FOR CLOSED-COURSE AIR RACING

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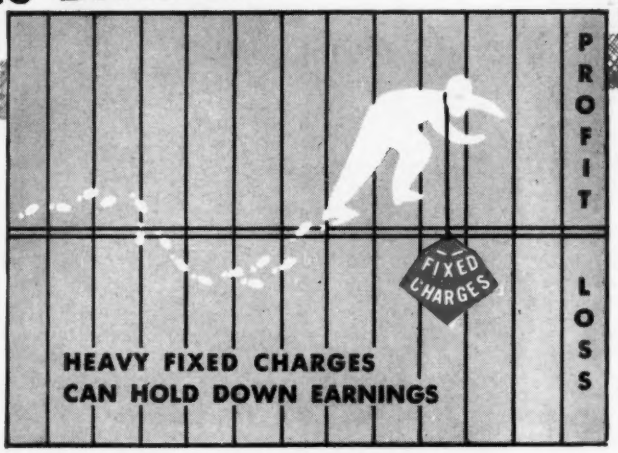
question for airline management...

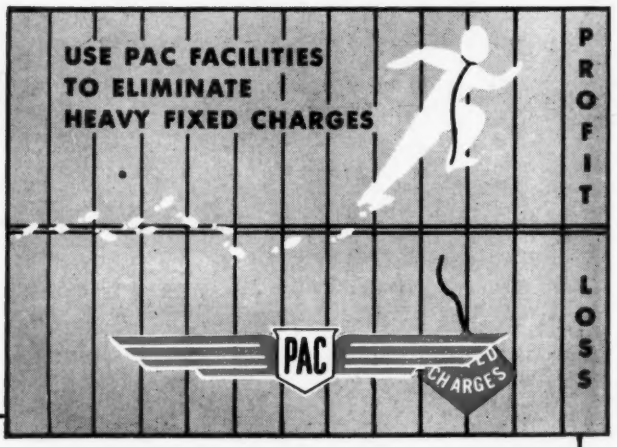
How Low Can You Keep Overhead

of Your Maintenance Division?

Is it necessary to carry the high fixed charges of a complete, company-owned maintenance division month after month—even during low-revenue periods?



Isn't it better policy to gear overhead to revenue by using PAC's complete overhaul and maintenance services—thereby avoiding fixed charges on shops, tools, and inventories?



Through Pacific Airmotive, you obtain prompt, top-quality overhaul of engines, accessories, propellers, instruments, and airframes at prices *lower than your own costs.* You avoid unnecessary investment in expensive tools and facilities. You achieve a desirable economic flexibility, so that you can reduce overhead drastically during low-revenue periods and yet expand operations quickly when conditions change.

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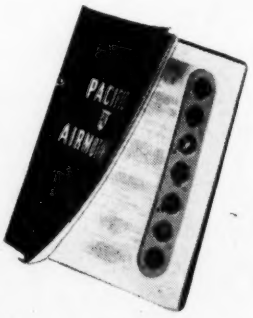
PAC provides maintenance and contract overhaul to major airlines and cargo carriers at five major-base locations in the United States and Alaska. We will be glad to send you further particulars.

SUPPLIES

PAC distributes more than half-a-million different aviation items, including engine, accessory, prop, and instrument parts and assemblies, through nine branches throughout the United States and in Alaska. Write on your letterhead for our #700 catalog and details on our rapid supply system.



PAC

PACIFIC AIRMOTIVE *corporation*

Executive offices at 2940 N. Hollywood Way, Burbank, California

Two-place experimental United Helicopters Inc. craft shown with company's head, Stanley Hiller, Jr.

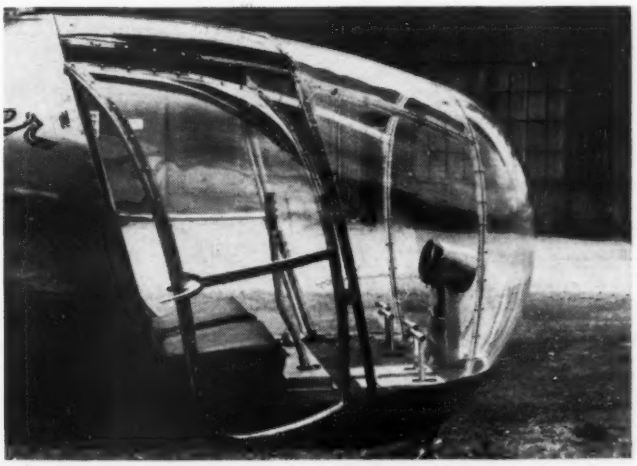
Hiller Simplifies Design To Cut 'Copter Production Costs

New approaches to simplified design to facilitate both production and maintenance are revealed in these exclusive AVIATION WEEK design detail photos of the United Helicopters, Inc. Commuter.

Many of these features will be incorporated in production models of the Commuter, Stanley Hiller, youthful head of the company told AVIATION WEEK. Principal changes, he reports, will be in a new control system now under development. Meanwhile, three aircraft embodying the principles shown here are continuing flight testing.

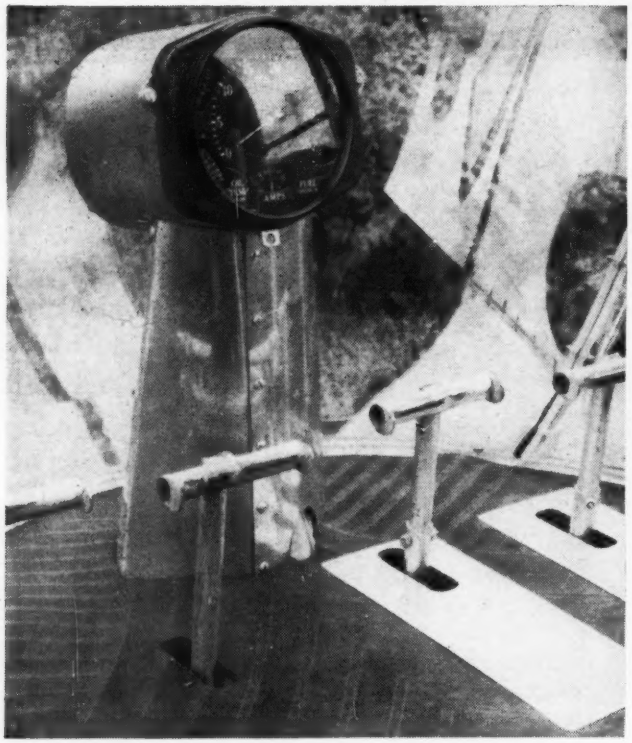
(*This article continued on page 30*)

To gain access to engine assembly two bolts are removed from within pilot cabin and entire tail cone removed as unit. This operation can be completed within one minute.

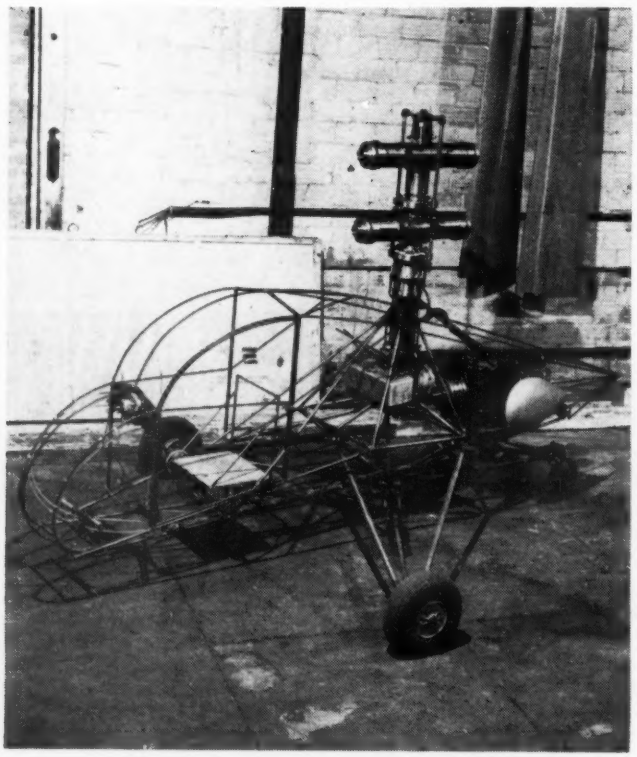


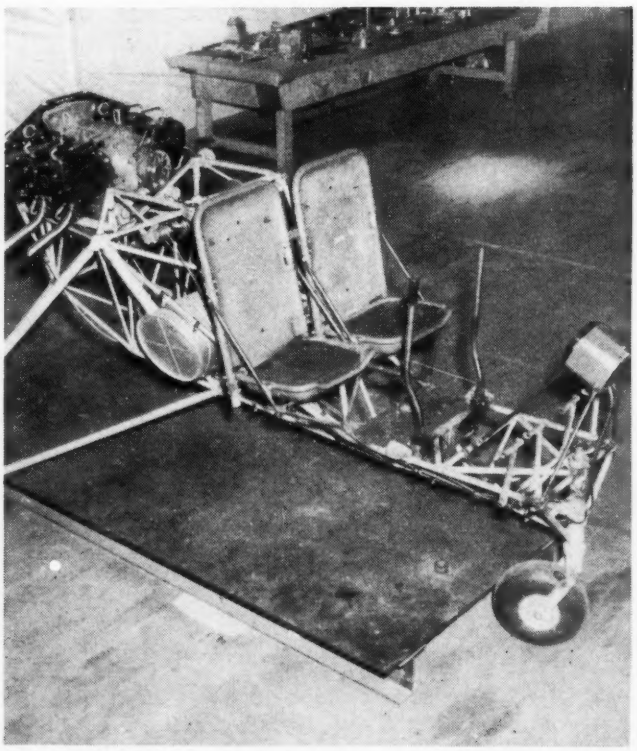
Maximum visibility was sought by Stanley Hiller, Jr. in designing Commuter cabin. Nose bubble is of heavy Plexiglas having little optical distortion. Stress members are carried under cabin.

Newest craft of young inventor includes features aimed at getting retail sales price down and keeping maintenance charges in line.



Clean appearance and simplified design are accomplished by instrument "pedestal" (left) in which single dial incorporates electric, oil temperature and pressure, fuel quantity and fuel pressure and tachometer readings. Closeup (right) showing engine with cooling fan installed. Fan operates on downdraft principle, drawing air through ducts in forward area of rotor base housing atop fuselage. Transmission gears will be installed on tubular structure just aft of seats, being secured by four bolts. Engine and rotor control cables are gathered in area directly over fuel tank and are readily accessible for maintenance.





Before and after—in more ways than one. At left is shown first 'copter built by Hiller to test coaxial rotor blade theories. Based on flight tests with this craft further development was carried on, resulting in present craft shown at right. Though advanced in every respect from prototype, further design simplification work is in progress before large scale production is undertaken.

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IF you've been looking for a better, lighter and less expensive aircraft radio, here it is — a high-performance transmitter-receiver that gives consistent transmission and reception even under adverse atmospheric and skip conditions.

It is the Lear AIRCRAFTER—a product of Lear quality and advanced engineering — a radio that provides VHF transmission on 6 frequencies, and beacon and broadcast reception with loudspeaker operation. The remotely controlled power amplifier unit is dynamotor driven, contains the complete transmitter and the IF and audio sections of the receiver.

So everything you've wanted in private plane radio is here in this Lear achievement. It's compact, easily installed and weighs under 15 pounds complete. More facts are listed in the box. Look them over — then get complete information from your Lear Aircraft Radio Dealer.

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OUTSTANDING FEATURES OF THE NEW LEAR AIRCRAFTER

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For Every Large Area Grass

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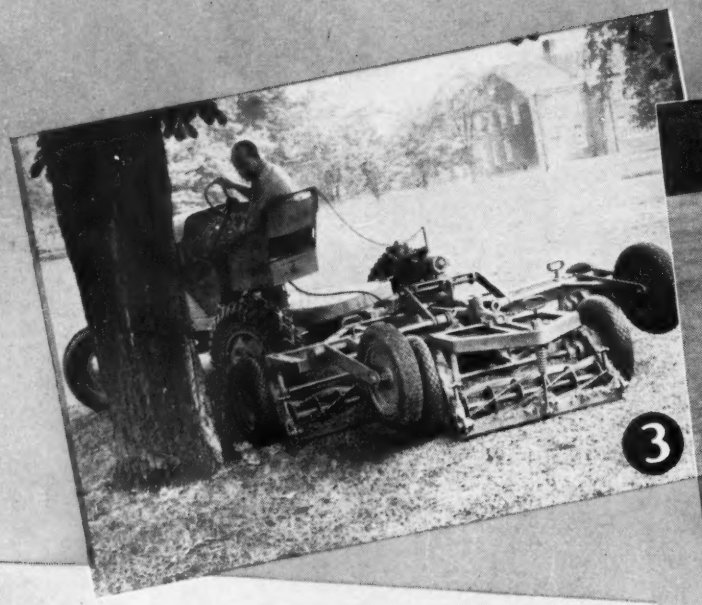
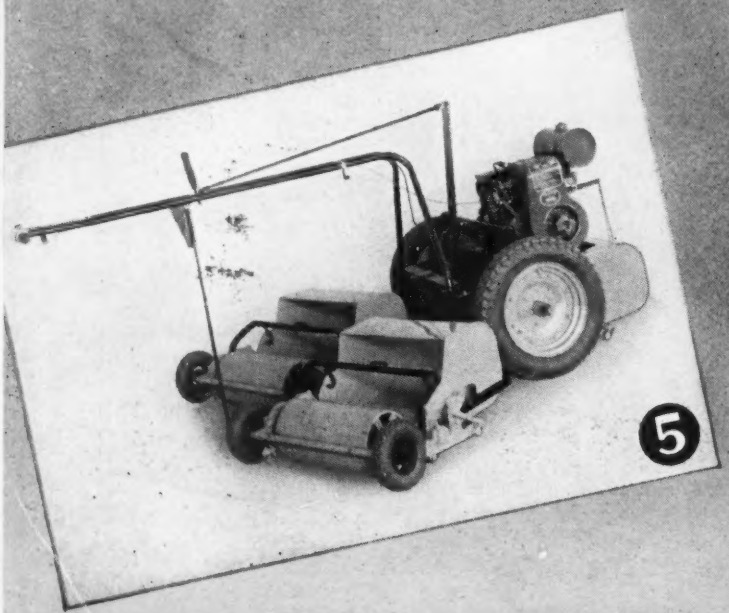




1 "CHIEF" TRACTOR

This rugged, powerful tractor is specifically engineered to team up with gang mower units for fast, economical work. Powered by a 100 hp. Chrysler industrial engine, the "Chief" has four forward speeds from 7.5 to 47.5 m.p.h.—a complete range for every working condition.

2 STANDARD FAIRWAY MOWER

Available in 3, 5 or 7 gang units, the fast-working Worthington Fairway gang mower maintains golf fairways and other large grass areas with a minimum of labor, time and cost. Individual gang units may be quickly added or withdrawn and the gang can be easily attached to any type of wheel tractor.

3 RANGER

The Ranger attachment consists of a Worthington Grass Blitzer type triple gang mower with its own hydraulically operated transportation wheels. A touch of the control lever and the entire gang mower is lifted and the transport wheels set down. Its 7 foot cutting swath (3 — 30" units) makes quick work of cutting jobs at parks, cemeteries, estates, institutions and highways.

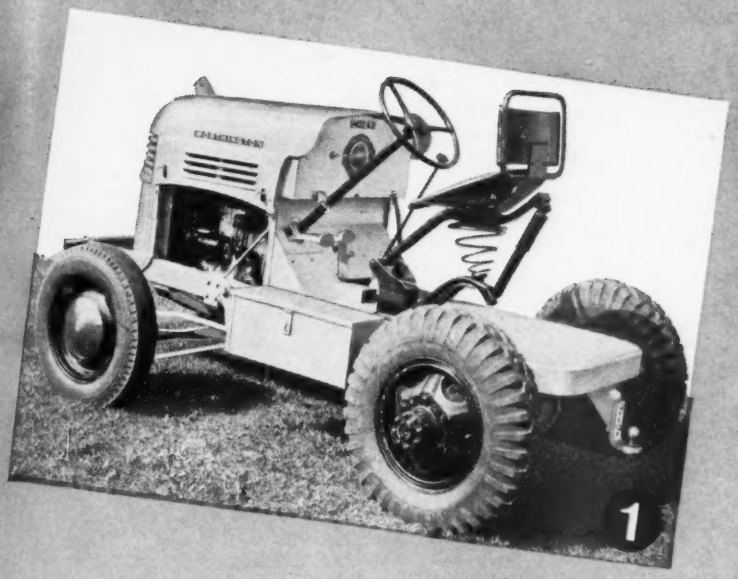
4 GRASS BLITZER

The 9 gang is capable of mowing 46 acres per hour at a speed of 20 miles per hour. Ruggedly built for duty on airfields, golf roughs and road approaches, the sturdy "Grass Blitzer" is available in 3, 5, 7 and 9 gang units — a size and capacity to fit any need. The 10" reel with 4, 5 or 6 blades will answer the needs of your own local conditions.

5 OVERGREEN

A combination greensmower, tee mower, gang mower and utility tractor, the Overgreen disposes of cutting jobs quickly and thoroughly at a minimum of cost and effort. It is particularly effective on greens where its speed, capacity and efficiency really lighten the maintenance load.

s Cutting Job, There's a
S PECIALIZED MOWER



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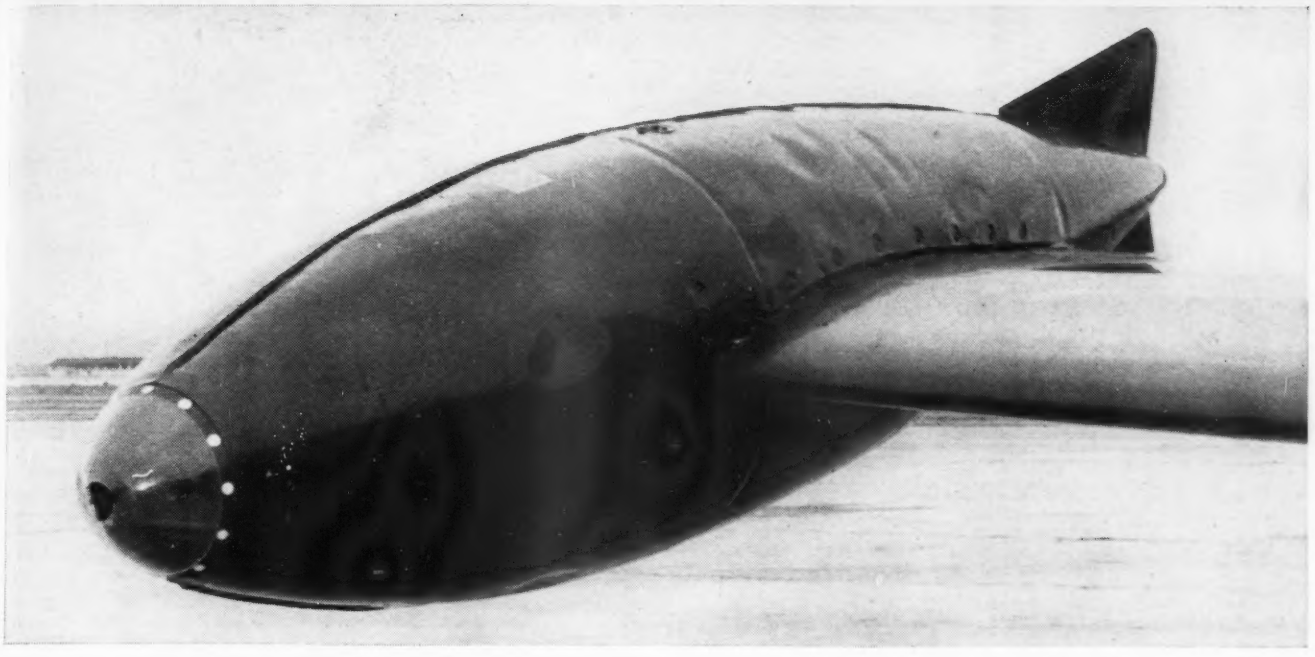


Better Air and Ground Handling Attained in North American XFJ-1

Navy's trim jet fighter has spring-released non-fouling wingtip tanks, also low-swirl dive brakes, and handy kneeling gear to ease positioning, stowage.

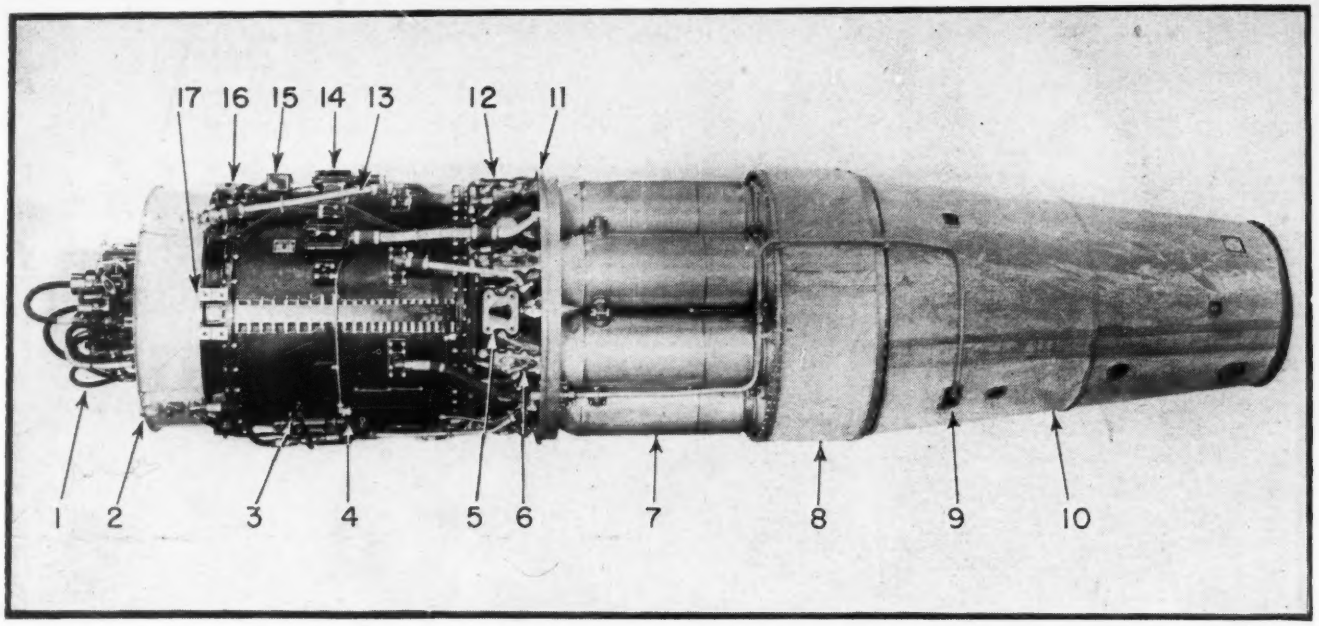
Disclosed for the first time at Muroc Army Air Base is an "aerodynamic release" wingtip tank fitted to North American's 550-plus mph. XFJ-1 Navy jet fighter (top). Feature of the installation is method of jettisoning. When attachment lugs are released, a spring operates to push the tank away from the wing, the induced "horizontal lift" acting to pull it out of the flight path. Upper and lower fins on the tank's aft end serve to stabilize separation from the wingtip, thus preventing the tank's rear from whipping inward and striking aileron.

To insure that application of the XFJ-1's dive brakes will not cause large swirls resulting in tail buffeting, the perforated units seen at lower left are employed, creating only small vortices. Although comparatively little braking surface is apparent, this perforated configuration is effective, since drag does not decrease proportionately with decrease in area of surface presented.

For easier ground handling and closer stacking on carrier deck or in the hangar, the XFJ-1 is equipped with kneeling nose gear (lower right). Two telescopic cylinders attached to the nose wheel strut are employed to raise or lower the nose gear independently of the main gear. A lock-pin engages the cylinders and the landing gear control handle is set at neutral. With the dolly installed on the nose strut, a control valve in the fuselage radio compartment forward of the wing leading edge is set for kneeling. Hydraulic hand pump, also located in the compartment, is operated to lower the nose of the craft until the gear is completely retracted and the dolly rests on the ground, taking the weight of the craft.

To raise the nose, the control valve is set at unkneeling position and landing gear control handle placed in the down position. Operation of the hand pump then fully extends and locks the nose gear for normal usage.

The craft is powered by an Allison-made General Electric TG-180 turbojet (analyzed elsewhere in this issue), and has very thin laminar flow wings, the fuel tanks being housed in the fuselage. (Photos at top and lower left by A. U. Schmidt).



LEFT SIDE VIEW of TG-180: (1) Engine accessories, (2) forward air guide, (3) flow divider, (4) ignition transformer, (5) horizontal main mounting trunnion, (6) fuel nozzle connection, (7) combustion chambers, (8) turbine casing assembly, (9) turbine wheel cooling air line, (10) exhaust cone assembly, (11) engine firewall baffle, (12) midframe, (13) thrust balancing pressure line, (14) bearing cooling air filter, (15) electrical junction box, (16) forward frame, and (17) horizontal forward mounting trunnion.

Design Analysis of The General Electric TG-180 Turbojet

Revealed here for the first time are engineering details of the most widely specified American jet power plant—data prepared exclusively for AVIATION WEEK by a top designer closely connected with the development project.

By NEIL BURGESS

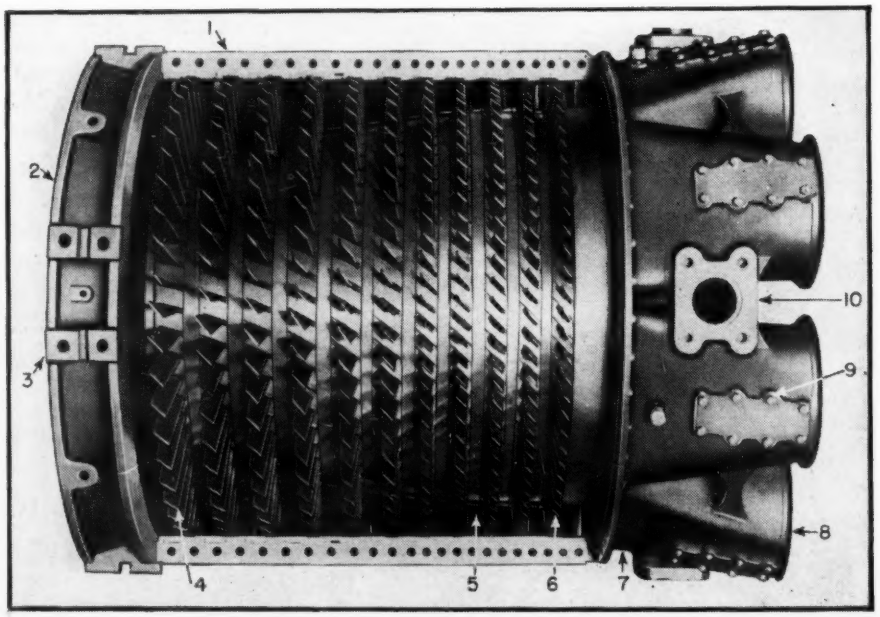
Aircraft Gas Turbine Engineering Div., General Electric Co.

Most extensively adopted American turbojet today is General Electric's axial flow TG-180 (J-35). Installed in a wide variety of the latest military craft—bombers, fighters, a transonic research plane, and other types as yet undisclosed—this jet plant evidences an exceptional degree of design refinement, displaying a notable minimizing of exterior piping and gadgetry.

Development of the TG-180 was initiated by GE in May, 1943, at request of the AAF Air Materiel Command. First test flight with this turbojet was in Republic's XP-84 in Feb. '46. Several engine models are being produced, differing principally in minor installation requirements of the various craft in which employed (Convair XB-46, Douglas XB-43 and D-558, North American XFJ-1 and XB-45, Martin XB-48, Northrop YB-49, and P-84).

► **Axial-Flow Compressor**—The compressor consists of eleven bladed-disks shrunk on a

(*Continued on page 39*)



COMPRESSOR ASSEMBLY with upper half of casing removed. Details are: (1) Compressor casing, lower half, (2) forward frame, (3) mounting trunnion, (4) first stage rotor disk, (5) stator blade, (6) eleventh stage rotor disk, (7) midframe, (8) combustion chamber opening, (9) for fuel nozzle opening, and (10) main mounting trunnion.

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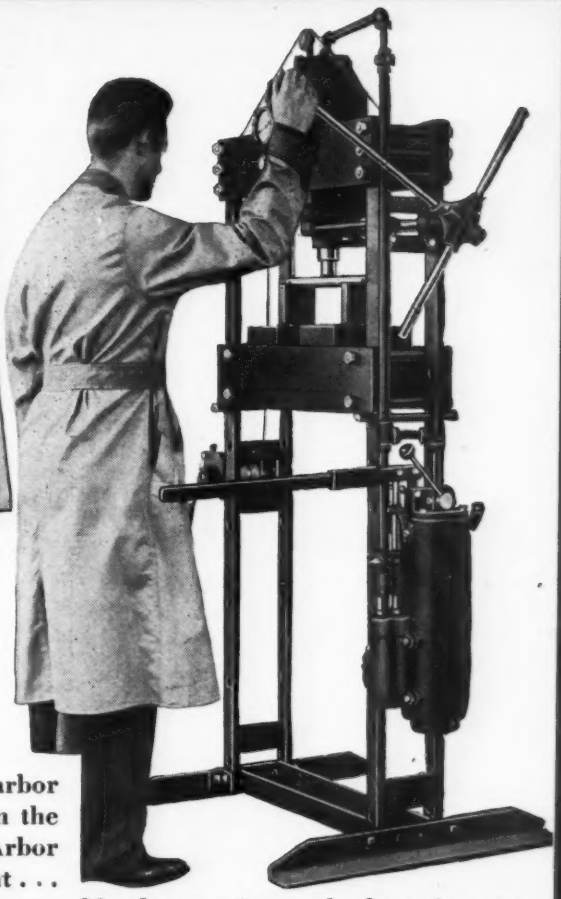

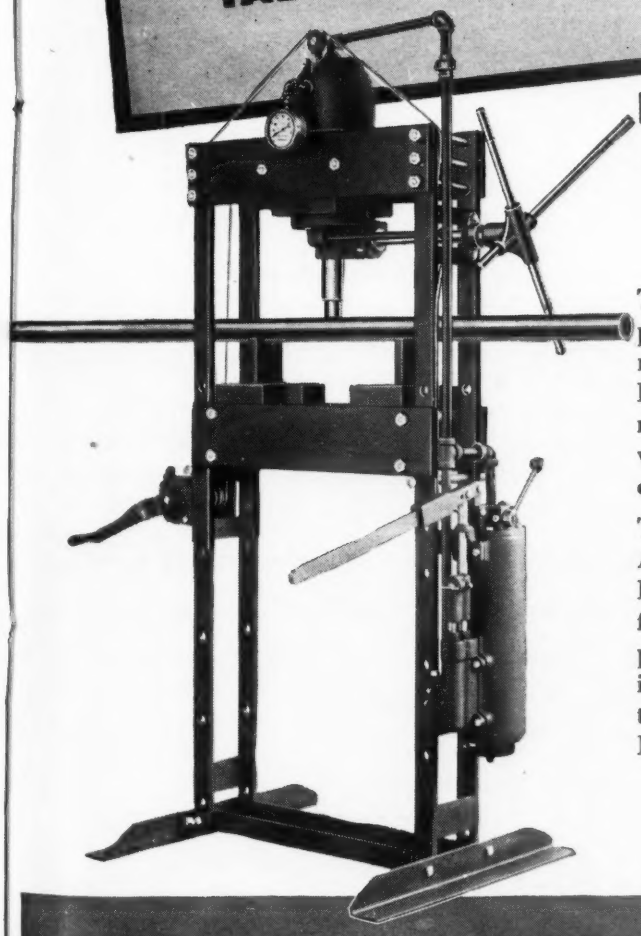

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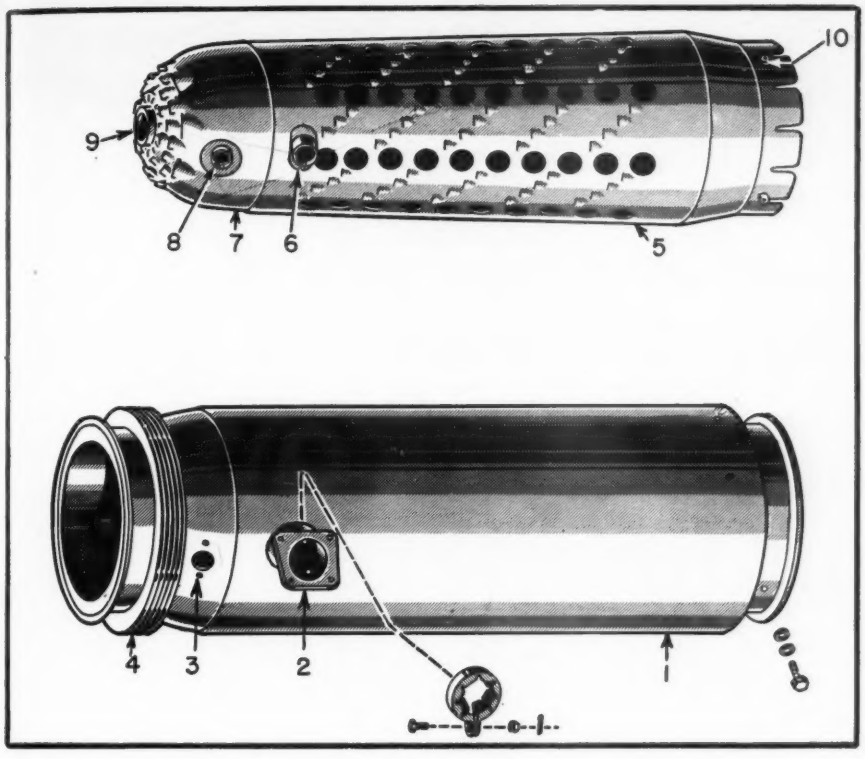


TYPICAL COMBUSTION CHAMBER: (1) outer chamber, (2) outer cross ignition tube assembly, (3) ignitor plug flange, (4) expansion bellows—internal on most models, (5) combustion liner, (6) ferrule for cross-ignition tube, (7) liner dome, (8) ignitor plug ferrule, (9) fuel nozzle ferrule, and (10) liner support boss.

steel shaft and enclosed in a cast aluminum outer casing. First ten disks, forming first ten stages, are machined from aluminum forgings; eleventh disk—last compressor stage—is a heat-treated steel forging directly linked by a splined fit to the turbine shaft.

Compressor rotor blades, forged and coined to size, are attached to disk rims with trapezoidal-shape dovetails. The disks are connected by cylindrical aluminum spacer rings shrunk under the rim shoulders, and each disk is secured to an adjoining spacer ring by steel pins to carry the driving torque.

Compressor casing (stator) is horizontally split into halves, bolted together around rotor and secured at the ends to the cast aluminum alloy forward frame and midframe. These frames are the main mounting structure of the unit, and, unlike compressor casing, are not split. Stator blades, also forged and coined to size, are dovetailed into split rings, in turn assembled into the stator halves. Eleven rows of stationary blades are used, followed by two rows of final straightening vanes. Accessory-drive casing is bolted to the forward frame, which also acts as a bearing support for the front (No. 1) bearing. Midframe, at rear of compressor casing, supports the main turbine structure, or aft frame, and serves as a support for main thrust (No. 2) bearing. Engine main mounting trunnions are on the horizontal and vertical centerlines of midframe, located at the unit's C.G.

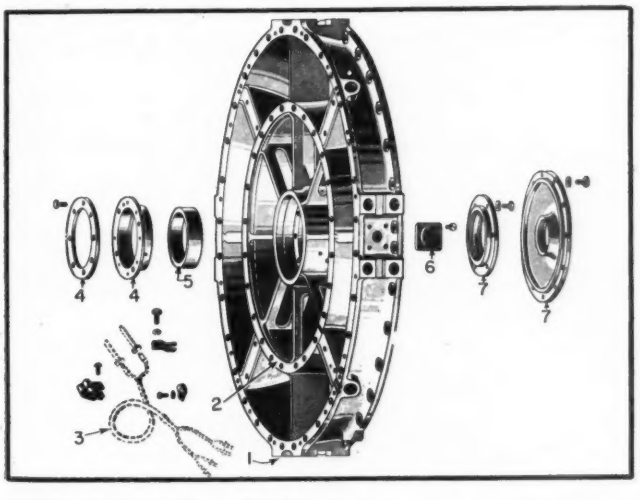
► **Combustion Section**—Eight cylindrical combustion chambers, supported by the midframe and the aft frame, are mounted circumferentially around latter, and are joined to the frames by clamping rings. Each combustion unit consists of an outer chamber fitted with removable liner and fuel nozzle, two of the eight chambers being fitted with ignitor plugs.

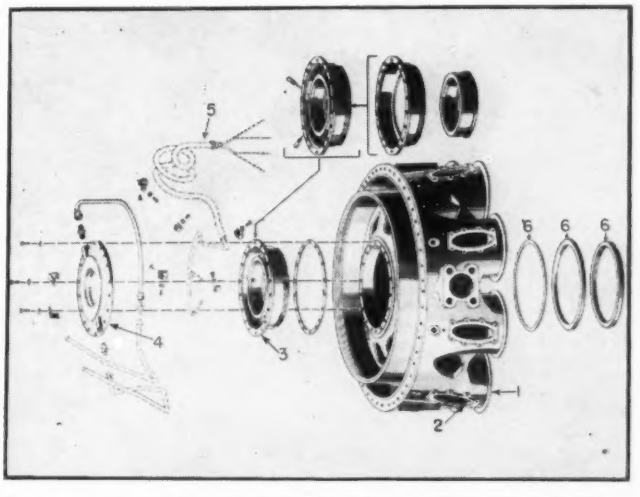
During combustion, some compressor air is admitted to the liner at the dome, or front cap; balance of compressor air is fed to the liner throughout its length via holes and louvers in the shell, thus serving to dilute the very hot gases in the dome region to the desired turbine inlet temperature (about 1,500 deg. F.) and keep the liner cool. Combustion and dilution processes are complete when the combustion gases reach turbine nozzle diaphragm.

Combustion chambers are joined near their forward ends by cross-ignition tube connections into which inner crossover tubes are inserted, thus linking the individual liners and spreading combustion from one chamber to the next. At aft end of each liner, a transition piece distributes the hot gases to the turbine nozzle diaphragm. The engine is designed to permit ready replacement of transition pieces and liners without engine disassembly.

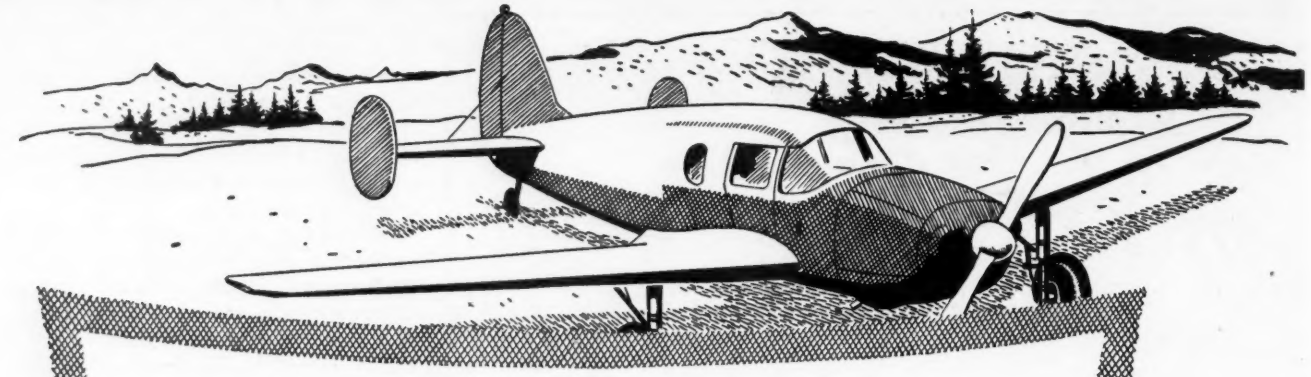
Aft frame is bolted to midframe, provides support for the entire turbine and exhaust assemblies, and also embodies the support plate to which combustion chambers are connected. A fabricated assembly of stainless steel, it utilizes internal longitudinal hat-section stiffeners.

Immediately aft of midframe, a firewall





FORWARD FRAME ASSEMBLY (at left): (1) Lower trunnion, (2) flange for bolting gear casing, (3) bearing thermocouple, (4) No. 1 bearing housing, (5) bearing outer race—inner race is assembled on rotor, (6) screen for air vent openings, and (7) bearing oil seals. Midframe assembly (at right): (1) combustion chamber opening, (2) fuel nozzle port, (3) No. 2 bearing housing, (4) bearing oil seal, (5) thermocouple, and (6) parts for assembling No. 2 bearing housing.



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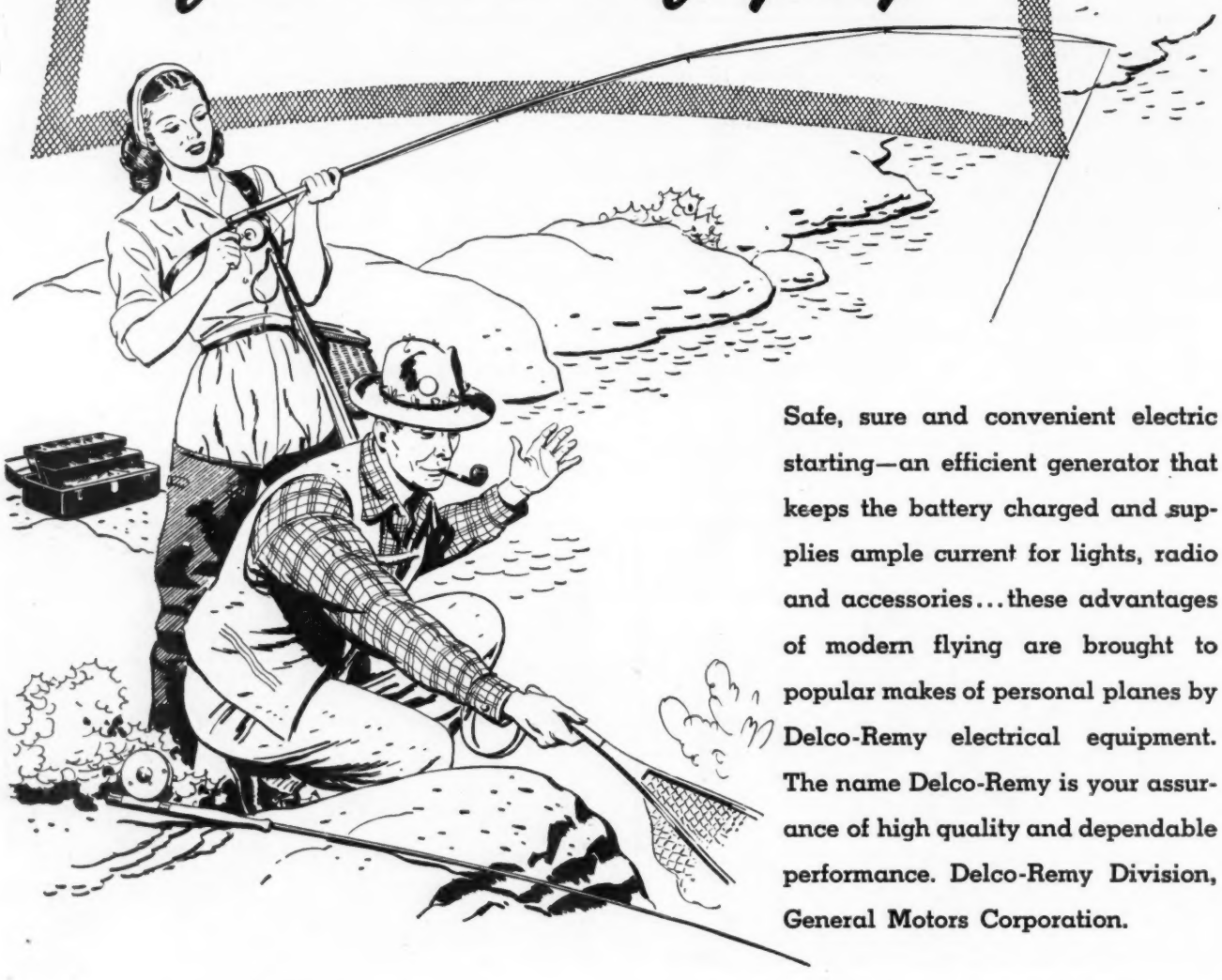

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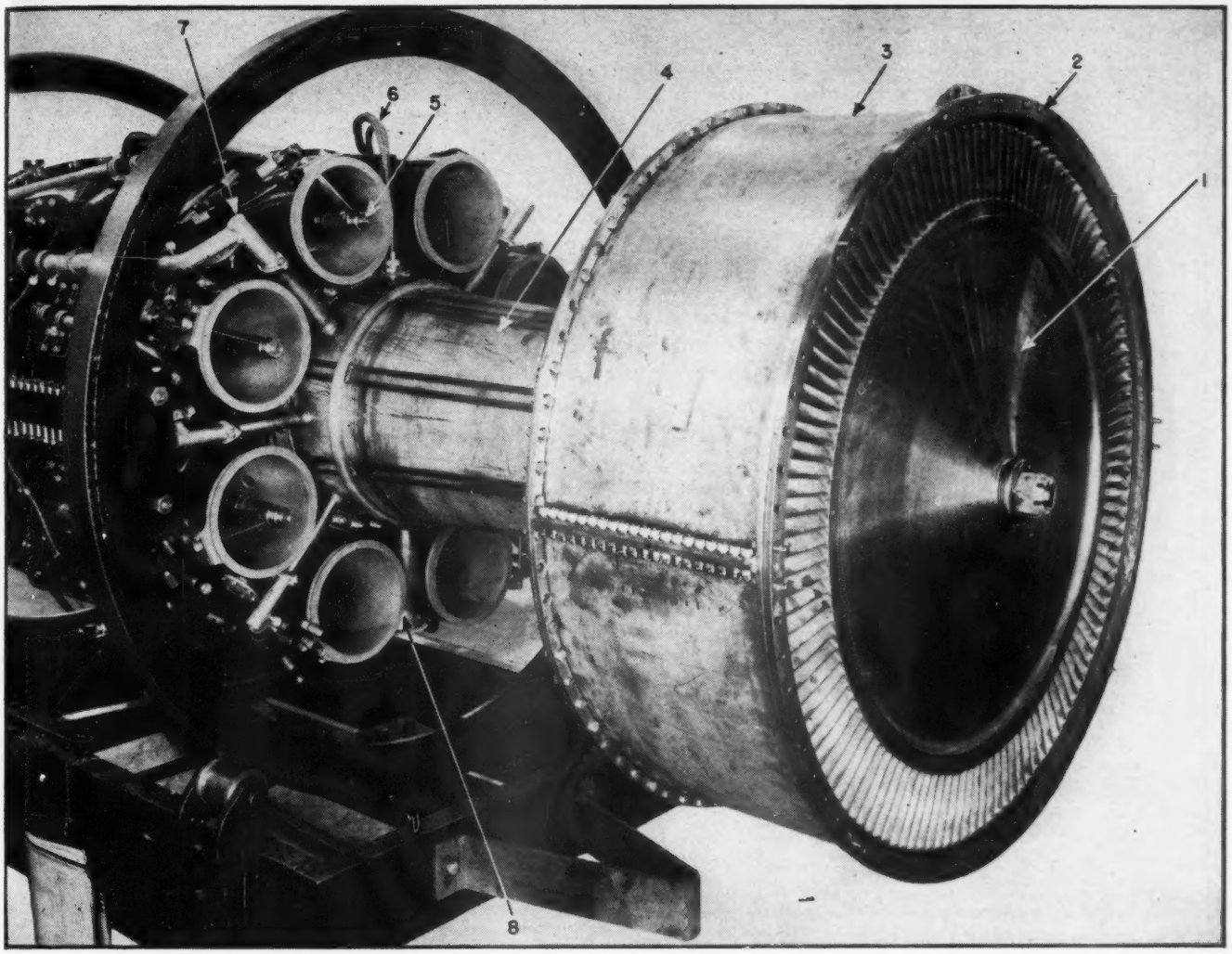
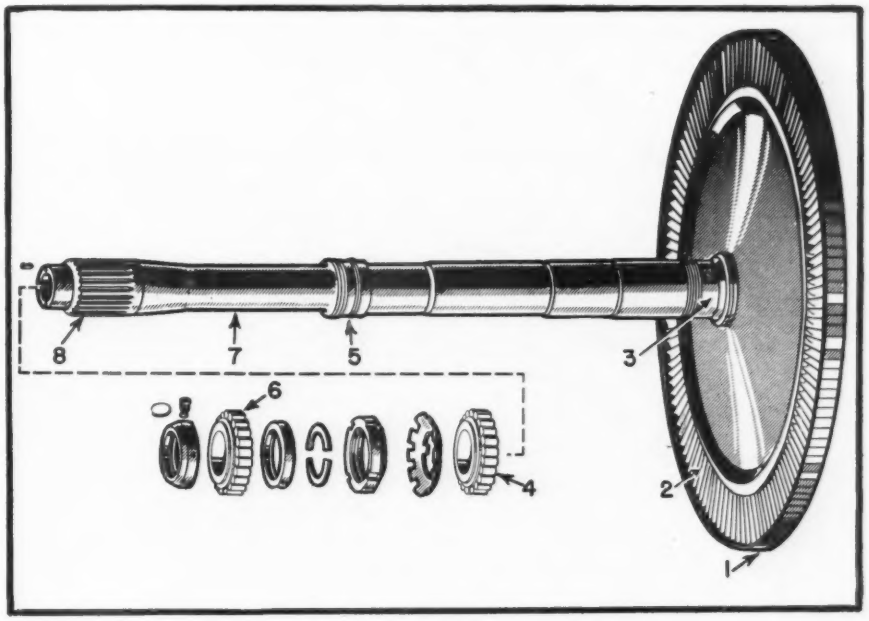


THREE-QUARTER VIEW of engine in disassembly stand with exhaust cone and combustion chambers removed. Parts are: (1) Turbine wheel, (2) flange for bolting to exhaust cone, (3) turbine stator casing, (4) aft frame, (5) fuel nozzle, (6) bearing thermocouple harness, (7) typical bearing cooling air connection, and (8) drain connection for lubricating oil and cooling air.

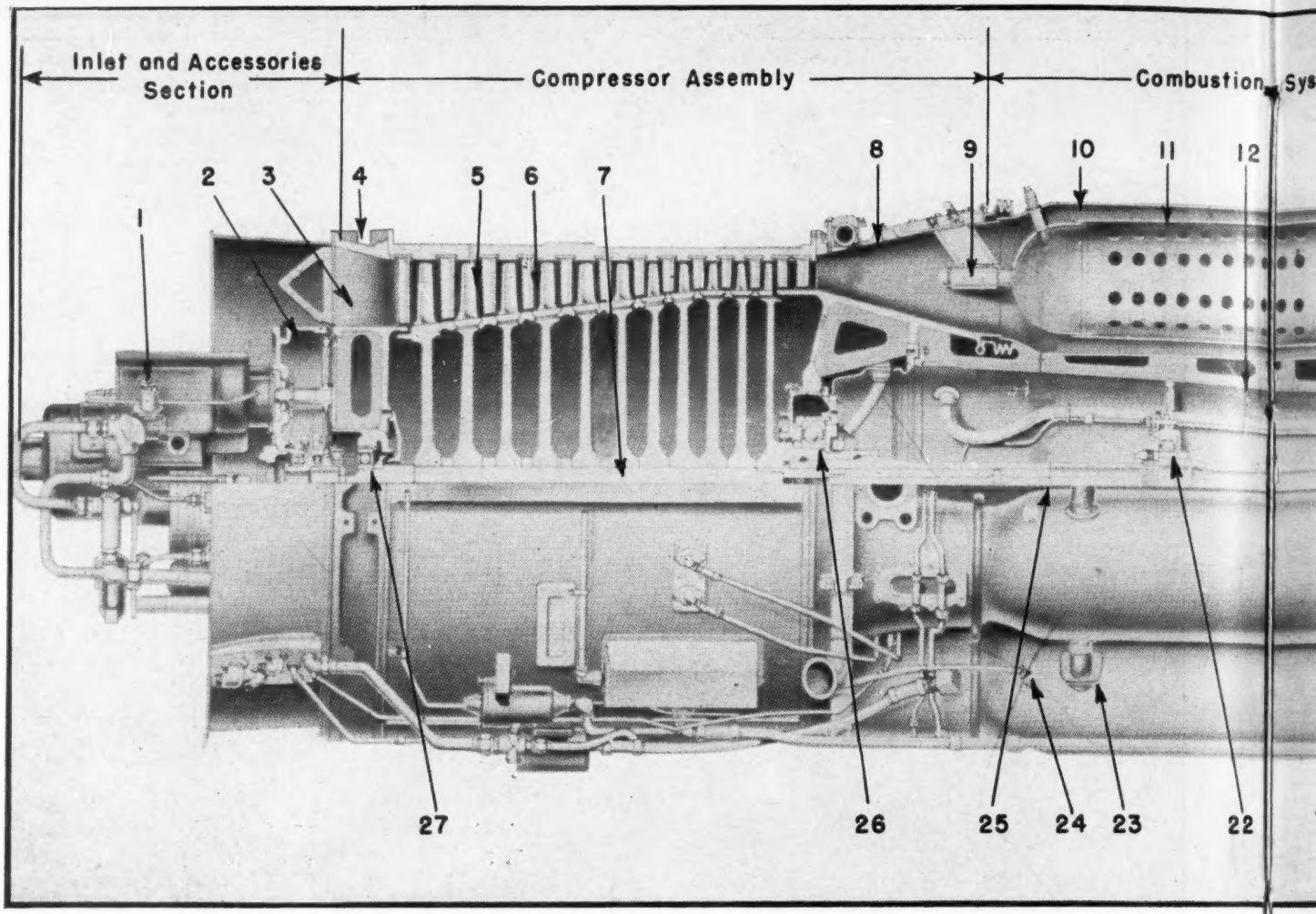
baffle isolates the front part of engine with its fuel and lubrication piping from the hot turbine parts at the aft end. While no engine cooling is required aft of the firewall, ventilation or insulation is normally required to protect the aircraft structure from radiated heat. The firewall baffle is fabricated stainless steel or an integral part of the engine midframe casting, depending upon the engine model.

▶ **Turbine Assembly**—Turbine unit is a single-stage impulse-type installation consisting of the nozzle diaphragm and wheel and shaft. The hollow turbine shaft is splined at compressor end to fit splines in compressor eleventh stage wheel. Turbine blades, forged heat-resistant alloy, are welded to wheel rim and shrouded to improve vibration resistance. Turbine wheel, forged integral with the shaft to provide maximum strength, is cooled by air extracted from the eighth compressor stage and delivered to both sides of wheel, thus helping to reduce heat conducted along the shaft from the wheel hub into the rear bearing.

Nozzle diaphragm consists of fabricated



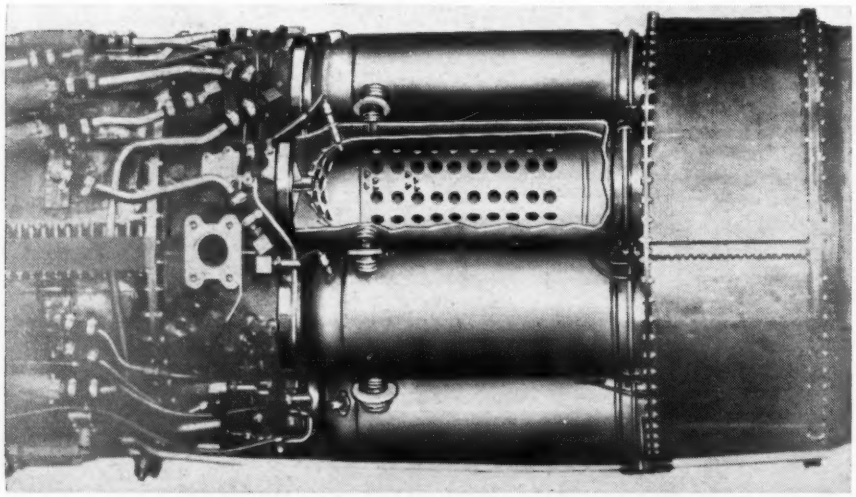
TURBINE ROTOR ASSEMBLY: (1) Turbine wheel, (2) buckets, (3) No. 4 bearing journal, (4) No. 4 bearing, (5) No. 3 bearing journal, (6) No. 3 bearing, (7) turbine shaft, and (8) Main drive spline—fits into compressor rotor hub.



PART-SECTIONAL VIEW of TG-180 turbojet: (1) Accessories, (2) accessory drive gear casing, (3) compressor air inlet, (4) forward frame, (5) compressor rotor, (6) stator, (7) rotor shaft, (8) midframe, (9) fuel nozzle, (10) combustion chamber, (11) combustion liner, (12) aft frame, (13) transition liner, (14) turbine nozzle diaphragm, (15) turbine wheel, (16) outer exhaust

inner and outer spacer bands with punched holes to receive the ends of 64 equally spaced blades to form the nozzles. Blades, fabricated from sheet stock welded to the spacer bands, are not cooled.

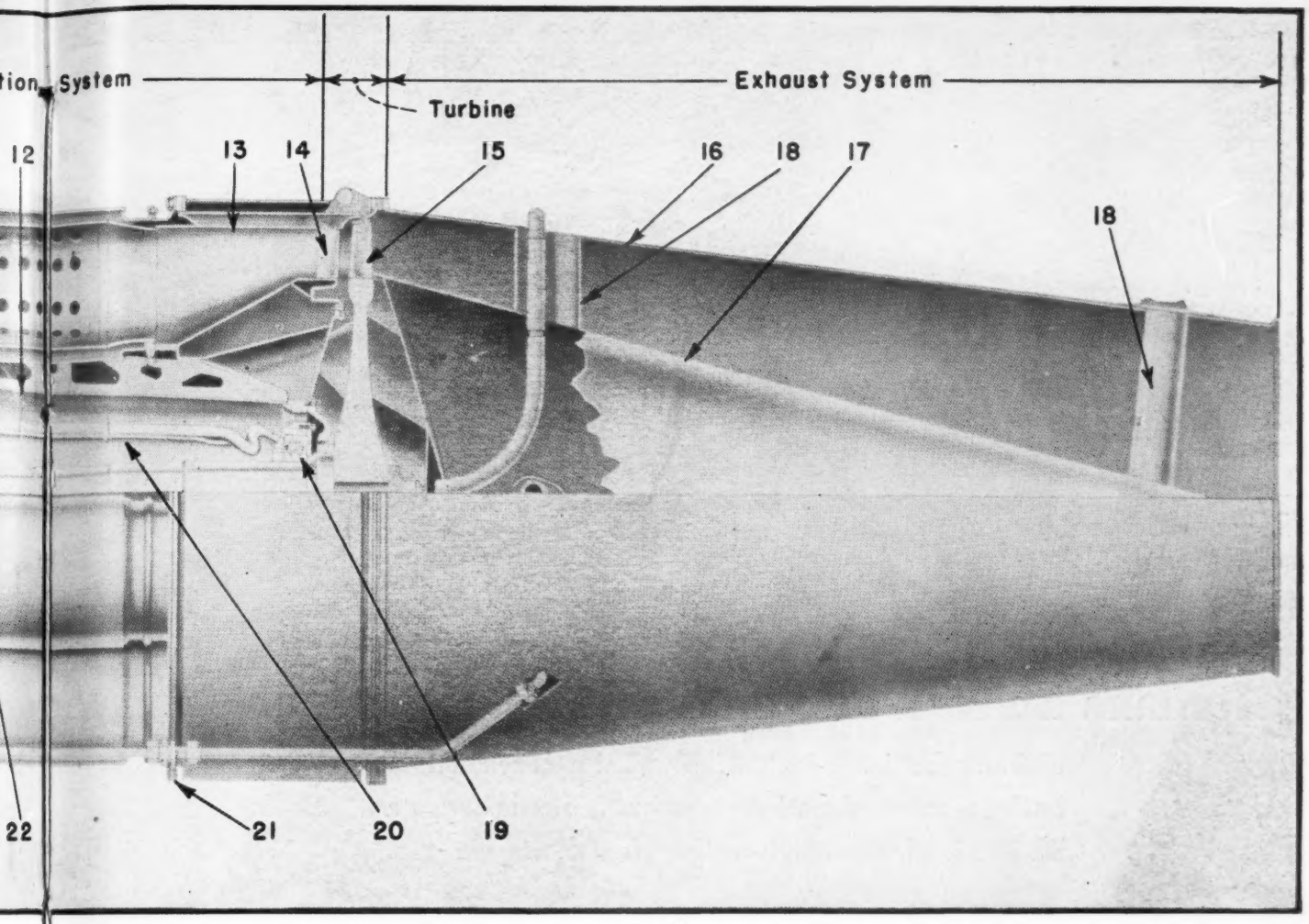
Unit is so designed, that after removal of the exhaust cone, the turbine wheel and nozzle diaphragm may be removed for inspection or replacement without complete engine disassembly.



DETAILS OF COMBUSTION CHAMBER INSTALLATION. Clamp rings are visible at extremities of the separate units. Transition liners (not seen) leading from chambers to nozzle diaphragm are housed between bolted circumferential members seen at right.

► **Shaft and Bearing Arrangements**—Main rotor assembly, comprising the compressor and turbine rotors, is fastened rigidly by a spline connection inside the hub of the eleventh stage compressor disk to carry torque; and by a single long bolt, or drawbar, running through the hollow turbine shaft into the compressor eleventh stage wheel hub, to carry the axial load of the turbine wheel into the compressor rotor assembly and main thrust bearing.

Main engine bearings are all super-precision quality anti-friction units, for low torque and low heat rejection. Front roller (No. 1) bearing is located in the forward frame on the front end of the compressor shaft. Main thrust (No. 2) ball bearing is on the hub of the eleventh stage wheel and carries the axial thrust of the entire rotor assembly. Bearings Nos. 3 and 4 are roller type, mounted on the turbine shaft and located in the aft frame. Bearing No. 3 is a damper unit to prevent excessive shaft vibration.



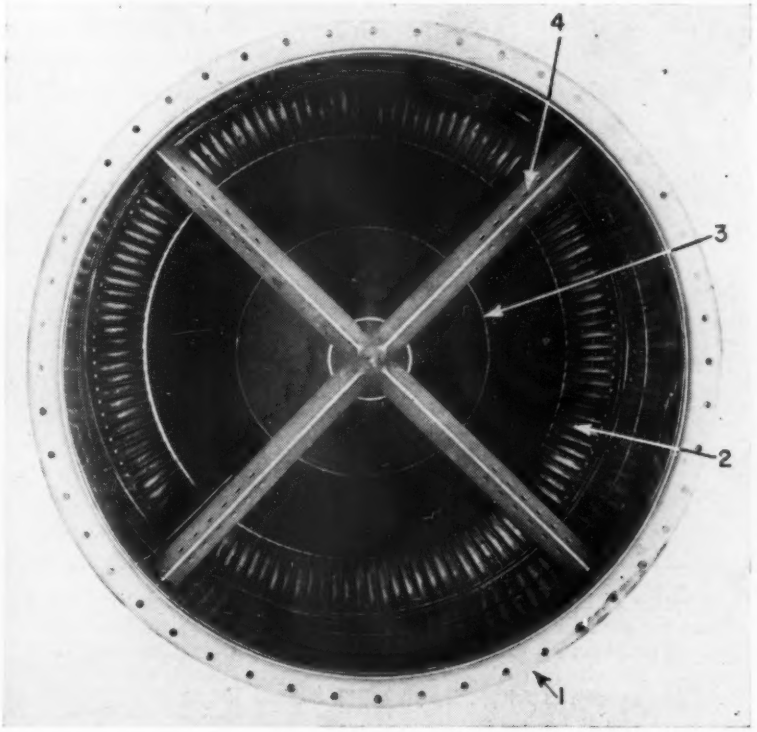
cone, (17) inner exhaust cone, (18) support strut, (19) No. 4 bearing, (20) typical oil line and air line supplying No. 4 bearing, (21) burner support plate, (22) No. 3 bearing, (23) cross-ignition tube, (24) ignitor plug, (25) turbine shaft bolt, (26) No. 2 bearing, and (27) No. 1 bearing. No. 2 bearing carries rotor assembly axial thrust; No. 3 bearing acts as vibration damper.

To balance axial thrust on the rotor, air is extracted from the compressor eighth stage and used to provide a balancing pressure on the face of the first stage wheel.

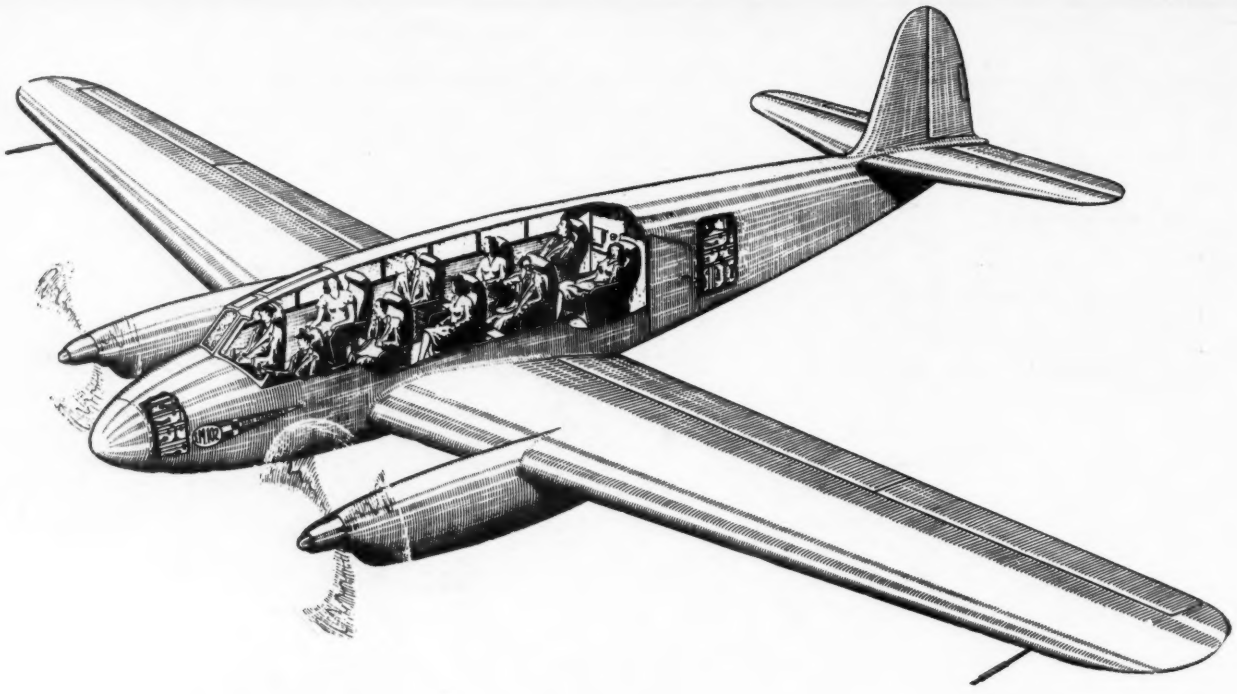
►**Exhaust Cone**—Discharge gases are collected in the exhaust cone, consisting of a stainless steel outer shell and central cone supported from the shell by eight streamlined struts. From the exhaust cone end, gases pass through the exhaust pipe to the exhaust nozzle, restricted to provide high discharge velocity. It is customary to adjust the size of exhaust nozzle to maximum permissible exhaust temperature to utilize maximum thrust obtainable from a given engine.

Length of the exhaust pipe varies with each installation, and may be greater than ten feet.

(Additional details—covering accessories; lubrication, fuel, ignition, and starting systems; engine mounting; and pilot's controls —will be presented in our next issue.)



REAR VIEW OF TG-180: (1) Exhaust flange, (2) turbine buckets, (3) inner exhaust cone, and (4) support struts.



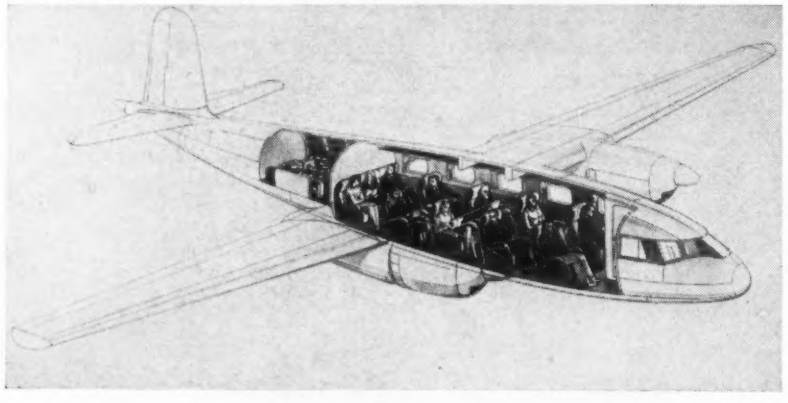
Italians Start Work on Two New Transports

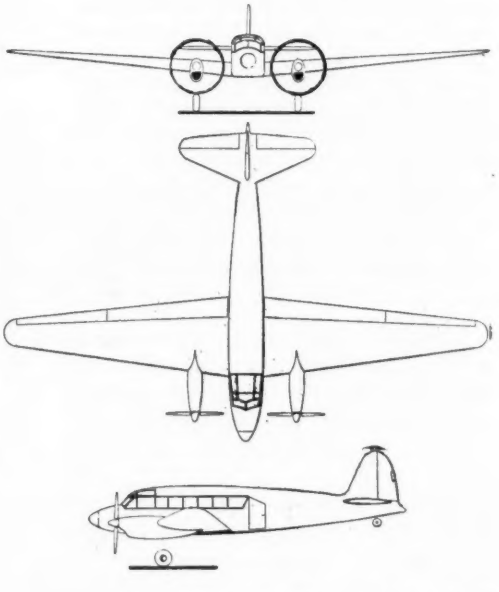
Siai-Marchetti SM-102, of composite construction, built around American engines. Breda-Zappata BZ-309 is all-metal high-wing craft with tricycle gear.

Italian aeronautical engineers today are progressing from the design to limited production stage of new types designed for peacetime operations, according to McGraw-Hill World News reports.

Newest project of Siai-Marchetti is the 8-passenger SM-102, designed for short-haul work within Italy itself. Now in preliminary construction stages, the craft will be of composite construction: a metal fuselage and wood wings comprised of built-up plywood spars and ribs with plywood covering. Powered by two 450-hp. Ranger SGV-770C1B engines, the craft will have gross wt. of 9,700 lb., and empty wt. of 5,700 lb. Wing span is listed as 64 ft., length, 41 ft. and height 10 ft. 6 in.

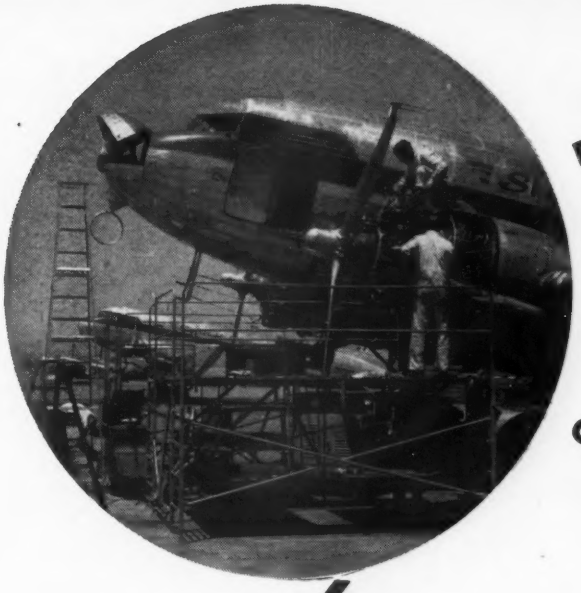
A slightly larger craft, but being built for the same type of operation, is the Breda-Zappata BZ-309, a high-wing all-metal craft designed for eleven passengers and crew of two. To be powered by two 900-hp. inline engines, design cruising speed is listed at 217 mph. Gross wt. is set at 12,125 lb., empty wt. at 8,050 lb., span, 65 ft., length, 48 ft.





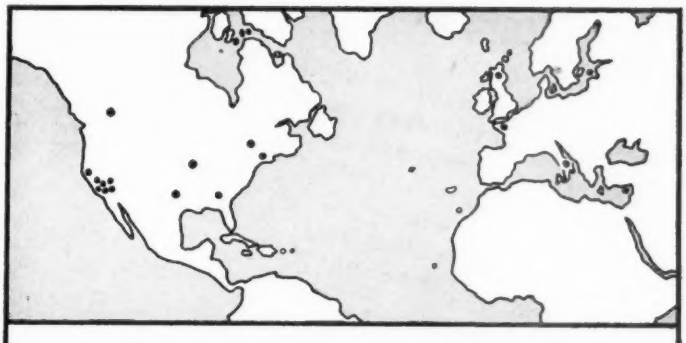
Artist's conception of Breda-Zappata BZ-309 (above), all-metal, high wing transport designed for eleven passengers and crew of two. With retractable tricycle landing gear cruising speed is slated to be 217 mph. Span is 65 ft. and wing area is 395 sq. ft. Siai-Marchetti SM-102 composite construction transport (right and at top) having span of 64 ft., length of 41 ft., and height of 10 ft. 6 in. Wing area is 457 sq. ft. Gross wt. is set at 9,700 lb., empty wt. is 5,700 lb.

For fast...efficient maintenance and repairs...consult one of these



DC-3
DC-4
C-47
C-54

Douglas APPROVED SERVICE CENTERS



1. DC-3, C-47, DC-4, C-54
Douglas Aircraft Company, Inc.
Santa Monica, Calif.

2. DC-3, C-47, DC-4, C-54
Aviation Maintenance Corp.
7701 Woodley Avenue
Van Nuys, Calif.

3. DC-3, C-47, DC-4, C-54
Grand Central Airport Company
1310 Airway, Glendale, Calif.

4. DC-3, C-47
Hughes Aircraft Company
Florence Avenue at Teale St.
Culver City, Calif.

5. DC-3, C-47
Northrop Aircraft Company
Hawthorne, Calif.

6. DC-3, C-47
Timm Aircraft Company
Metropolitan Airport
Van Nuys, Calif.

7. DC-4, C-54
Matson Aviation Maintenance Co.
Oakland Municipal Airport
Oakland, Calif.

8. DC-4, C-54
Texas Engineering & Mfg. Co.
Grand Prairie, Texas

9. DC-3, C-47
Southern Airways Company
Municipal Airport, Atlanta, Ga.

10. DC-3, C-47, DC-4, C-54
Aircraft Service Corporation
Bradley Field, Windsor Locks
Conn., and Miami, Florida

11. DC-3, C-47
Northwest Industries Limited
P.O. Box 517
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12. DC-3, C-47
Canadair Limited, P.O. Box 6087
Montreal, Quebec, Canada

13. DC-3, C-47
Scottish Aviation Limited
Prestwick Airport
Ayrshire, Scotland

14. DC-3, C-47
S. A. B. C. A.
13 Rue de Brederode
Brussels, Belgium

15. DC-3, C-47
Societa per Azioni Fiat
Turin, Italy

16. DC-3, C-47
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The world-wide network of Douglas Approved Service Centers is taking shape. Here operators will find skilled men trained in servicing and repairing Douglas transport aircraft. Work is done fast... it is done well... and it is also done at minimum expense.

Only these *approved* centers have access to Douglas field and factory technical assistance, quality control methods, and the latest information from Douglas so vital in making repairs letter-perfect.

WARRANTED DOUGLAS PARTS are now available for the repairing and servicing of Douglas airplanes. Look for the Douglas emblem on these warranted Douglas parts.

For more complete information, write:

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THE "FLYING PANCAKE" Flies With SKF Bearings!

While designers for years have not been able to do better than a 1 to 4 ratio of landing speed to top speed, this "Flying Pancake" ranges from 40 to 425 m.p.h. with standard engines. And hidden away on its vital rotating parts are SKF Ball and Roller Bearings—the secret source of smooth and dependable performance. SKF Bearings have helped aircraft fly faster, higher and farther ever since Aviation was in its infancy. Today, they continue to prove they're the right bearings for the right places. 6279

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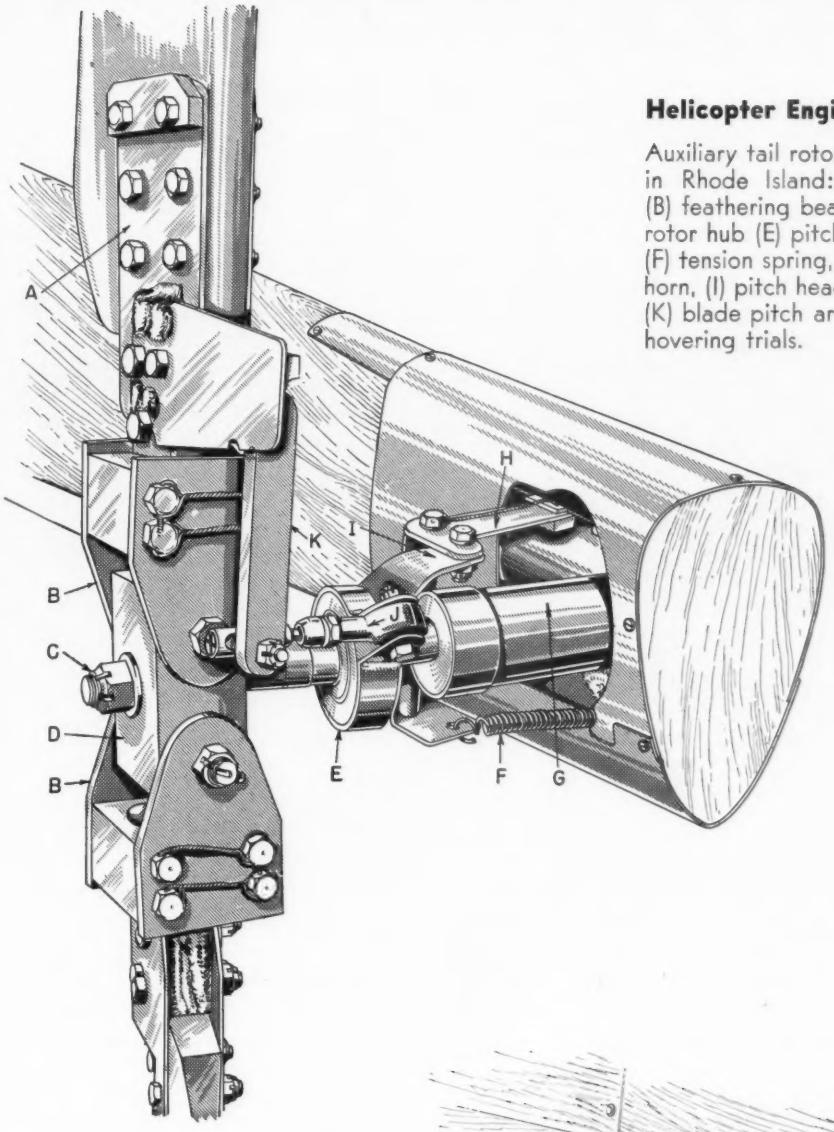
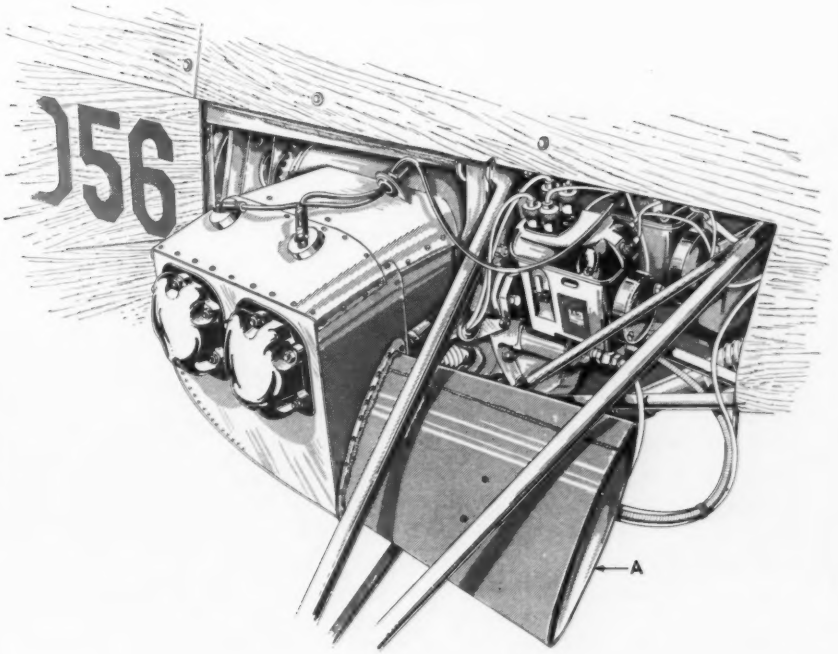
Sketchbook of DESIGN DETAIL



Helicopter Engineering & Construction Model 100

Auxiliary tail rotor detail of single-place craft developed in Rhode Island: (A) Blade retainer and root fitting, (B) feathering bearing retainers, (C) hub retainer nut, (D) rotor hub (E) pitch head containing internal ball bearing, (F) tension spring, (G) auxiliary rotor gearbox, (H) control horn, (I) pitch head arm, (J) pitch changing push rod, and (K) blade pitch arm. Craft is now undergoing tied-down hovering trials.



Underside-of-fuselage mounting of craft's 75-hp. Continental and accessories. Engine is fitted with exhaust ejector cooling system, outlet being through duct (A). Note how compactly power plant is cowled. (Also see March, 1947, "Aviation".)

Close-in Airpark Financed By Oklahoma City Businessmen

With investment of approximately $500,000 in the new Oklahoma City Downtown Airpark, financial backers of the new enterprise expect it will amortize the outlay over a period of 15 to 20 yr. Usage of the new field in advance of its formal dedication scheduled for July 4, indicated excellent patronage from both local and transient flyers, due to the field's close-in location.

Situated only 1½ mi. from the heart of the downtown shopping and business district, the airpark was originally planned by city officials as a municipal field. Later the city fathers decided to abandon the project, and a group of Oklahoma City business men, most of them private flyers, put up the funds to insure its completion.

When completed it is expected to be the finest downtown airpark in any city of its size in the country, and one of the few in the close-in category to be privately owned. Its financial success will be watched closely by aviation circles, since it may serve as a model for many other such enterprises.

▶ **Runways Completed**—The field has a 2,600-ft. north-south runway, and a 2,200-ft. northeast-southwest runway, and can handle planes as large as twin-engine Beechcrafts.

Already completed are individual T-hangar facilities for 35 planes and a large hangar for repair and overhaul shops. Additional hangars to provide space for approximately 100 more planes are scheduled for construction immediately, and when the airpark building program is finally completed there will be accommodations for a total of 200 planes.

A brick administration building now being completed will house a restaurant, pilot's lounge and airport offices.

▶ **Stock-For-Work**—Hal McKnight, former AAF pilot, is general manager and executive vice-president of the Downtown Airpark Corp., operating company.

Much of the investment thus far has been in the form of services by men or firms who were compensated with stock in the corporation. One did the grading, another provided asphalt for the runways, another provided the land, and still another the architectural and engineering work. Only construction of the administration building and hangars were contracted for outside the members of the corporation.

Sponsors and observers enthusiastically anticipate early and substantial returns from the enterprise. Time and money in the project reflect a civic aviation interest characteristic of Oklahoma City, original site of the National Aviation Clinic, which already enjoys a reputation as a strong supporter of air progress.

Ryan Continues Navion Pricetag

Flyaway figure of $7,750 remains pending production cost analysis.

Current price of the Navion ($7,750 flyaway factory) will be maintained until further notice by Ryan Aeronautical Co., San Diego, which will produce the former North American four-place personal and business plane, T. Claude Ryan, President, informed AVIATION WEEK.

Ryan said a detailed analysis of markets and production costs at the San Diego plant would be made to determine whether the price should be changed. His company has made no agreement with the former owner, North American Aviation, to defer Ryan production until the inventory of flyable Navions at North American is sold, but he expects it will be disposed of by the time his company is ready to start deliveries.

▶ **Ready by October**—He estimates his company will be tooled up and ready to start Navion production at San Diego by late October or early November.

Ryan said he hoped to take up the Navion sales program where it was discontinued by North American and to use the 17 Navion factory dealers appointed by North American.

The Navion program may constitute the main commercial aircraft planning of Ryan for the immediate future, at least, and is believed to have resulted in shelving several other airplane designs and at least one heli-

OKLAHOMA CITY DOWNTOWN AIRPARK—An investment of approximately $500,000 in private capital is being made in Oklahoma City's new Downtown Airpark, 1½ mi. from center of business and shopping districts. Originally projected as a municipal field, airpark was abandoned by city officials, so Oklahoma business men continued development.

Do you have this *Book of Facts* on Aircraft Tubing?

Designers and builders of all types of aircraft will find in this handy book a guide not only to the proper selection of aircraft tubing but pertinent data essential to its economical application.

Tells what you want to know about aircraft tubing

- ★ Contains digest of Government specifications covering chemical composition, physical properties and permissible dimensional variations, etc.
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copter that Ryan was considering for development. The Navion will be Ryan's ninth commercial aircraft, and his 21st plane, including military projects.

▶ **Dealer Reaction**—One dealer's reaction was:

"I will not be surprised if Ryan makes some changes in the Navion directed to greater luxury and comfort, and raises the price appreciably. I feel I would not have trouble selling it at $9,000."

President Ryan said he had no basic changes in mind for the Navion design: "Just as it stands, the Navion is the best of the bunch. That's why we took it on."

Neither company would disclose the lock-stock-and-barrel price that bought the Navion.

New Stinson Office To Aid Distributors

Recognizing one of the basic needs in the aircraft sales and service business, Stinson Division of Consolidated Vultee has established a business management office headed by an experienced automotive man who will act as a business consultant and analyst for Stinson distributors and dealers in the U. S. and Canada.

Stinson thus carries one step farther a practice common with many suppliers of emphasizing to distributors and dealers the need for sound business and accounting procedures.

Oil companies, in particular, in recent years have endeavored to assist their dealers in conforming to recognized business procedures

Stinson has appointed Walter A. Simon to head the new office, with the job of working closely with distributors and dealers to organize sales and business management aids.

Before joining Stinson, Simon was business manager for the Detroit zone of Chevrolet Motor Co.

NEW AERONCA LIAISON PLANE

Off-the-shelf purchase of 439 Aeronca lightplanes for liaison plane use by Army Ground Forces has resulted in Aeronca Model 7BC, basically Aeronca Champion tandem trainer with addition of plexiglas cabin top, and replacement of Champion's 65-hp. engine with an 85-hp. Continental with fuel injection carburetion. Aeronca was awarded two-place tandem contract on a bid of $1649 per plane, following competitive tests with other lightplanes at Ft. Bragg, Carolina. Order also includes 30% additional spare parts for replacements.

Continental Offers Dealer Ad Campaign

A local tie-in advertising campaign for dealers and distributors, built around the slogan "Start Flying Now" is being offered by Continental Motors Corp. in conjunction with a series of ads the manufacturer is placing in its own behalf.

Continental is sending material on the promotional campaign to some 8,000 operators, many of whom are company distributors or dealers. But mats of the ads, in a variety of sizes and shapes, are offered free to any operator who will buy space in local papers to run the ads. The ads would carry the dealer's own name, with no mention of Continental unless the sponsor is a Continental dealer.

Continental is replacing its competitive type of product advertising with the new campaign with the purpose of selling the public on the advantages of learning to fly. The ads stress the utility of light airplanes, and the "ease, simplicity and low cost" of obtaining a pilot's license. The reader is referred to the local operator for full details.

In explaining the reasoning behind Continental's action, D. H. Hollowell, Vice-President in charge of aircraft engine sales, said the campaign will run for the balance of the year. "Every airport in the country," he said, "has its regular hangers-on-folks who come out day after day to lean on the fence, watch plane take-offs and landings, and wish they could fly. They comprise a preferred prospect group which is well worth tapping. It's a safe assumption that many of them are putting off flying lessons because of misconceptions about the red tape and expense involved."

HELICOPTER CROP DUSTER

Two hoppers of 200-lb. capacity each, on either side of the Bell crop-dusting helicopter, are loaded with DDT-laden dust. Ejector tube through which dust is blown, mixed with air from engine fan, is seen at bottom of hopper. Downwash of helicopter's rotor blades swirls dust onto underside of plant foliage. Helicopter dusts a 60-ft. swath in one trip across a field, and covers between 100 and 200 acres per hr. Helicopter is variation of Bell Model 47, with 178-hp. Franklin.

The new Martin "202", transport, equipped with Auto-Lite Aluminum Cable.

TO HELP "202" FLY FARTHER . . . FASTER

Martin Engineers specify Auto-Lite

In designing the "202", Martin engineers included aluminum cable, built by Auto-Lite, to save precious pounds of weight and help assure the high performance demanded today of commercial air lines. Aluminum cable is typical of the many advanced products made by Auto-Lite during the past 36 years . . . advanced products which have again and again proven their dependability.

The specifying of Auto-Lite wire and cable is fast becoming standard practice among leading aircraft manufacturers. Here is ample proof of the Auto-Lite statement that "Money cannot buy better wire and cable". For complete information on the many types of Auto-Lite wire and cable available for aircraft, write to

THE ELECTRIC AUTO-LITE COMPANY
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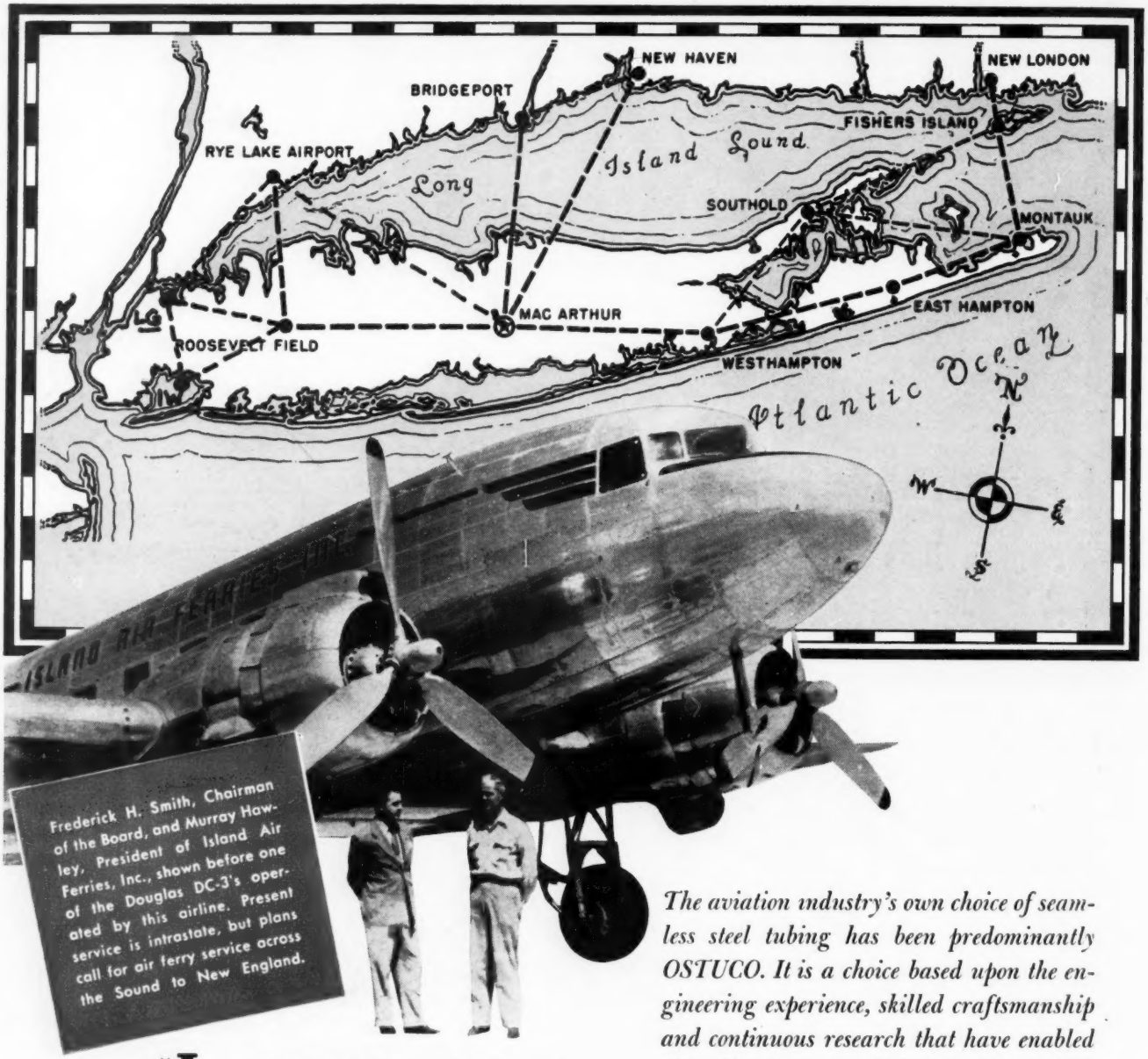
Tune in "Lawyer Tucker" starring Parker Fennelly, Thursday Nights, 9:00 P. M.—E.T. on CBS

AIRLINE on an ISLAND



Frederick H. Smith, Chairman of the Board, and Murray Hawley, President of Island Air Ferries, Inc., shown before one of the Douglas DC-3's operated by this airline. Present service is intrastate, but plans call for air ferry service across the Sound to New England.

"LONG ISLAND'S OWN AIR LINE" aptly describes Island Air Ferries, Inc. Operating since 1945, the line was established to provide fast transportation of passengers, mail, express and air freight in and out of Long Island.

Future plans call for uniting the highly industrialized New England area with Long Island, a plan that until the advent of air service had been effectively blocked by the presence of Long Island Sound. Many new industries, locating at various points along Island Air Ferries routes, augur well for the future of this "airline on an island."

The aviation industry's own choice of seamless steel tubing has been predominantly OSTUCO. It is a choice based upon the engineering experience, skilled craftsmanship and continuous research that have enabled The Ohio Seamless Tube Co. to keep pace with the progress of the aviation industry.

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Goodyear Building 15 Amphibs For Flight Test And Survey

Fifteen Goodyear Aircraft GA-2 Duck three-place amphibians now being completed, are to be sent out for probably the most exhaustive service test ever given to a new personal-type airplane not in production and not offered for sale.

Whether the Akron company will enter the plane in the lightplane market, and go into full scale produciton, has not yet been indicated although the 15 new planes are semi-production articles, following the development of the experimental Duck prototype which received its approved type certificate from CAA several months ago.

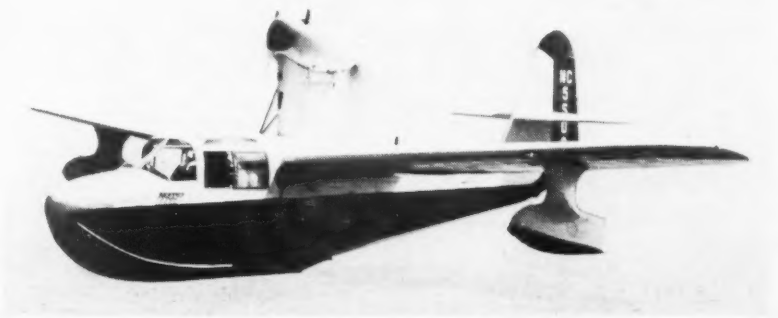
Some of the 15 planes will be used by Goodyear sales representatives to demonstrate aviation products of Goodyear Aircraft and the parent company, Goodyear Tire and Rubber Co., such as the castering aircraft wheel for crosswind landings, demonstrated in a production version for the first time on an amphibian at the recent Aviation Country Club lightplane show at Hicksville, L. I. The showing also was the first public demonstration of a retractable castering landing gear.

► **Widespread Flight Tests**—A plan to make other Ducks available to selected aircraft service operators, for normal use in their flying services is being studied by the company and may be announced soon. The plan would spot a number of the planes in different sections of the country for service performance tests in widely different climatic conditions.

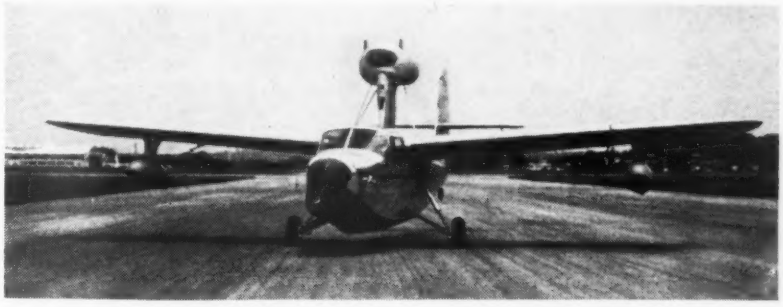
A 145-hp. Franklin engine, mounted as a pusher on a pedestal atop the 36-ft. span wing, powers the plane, which has two side-by-side seats in front and a third behind, with an 11-cu. ft. baggage compartment. Overall length is 26 ft. Plane is credited with cruising speed of 110 mph., top speed of 125 mph. and 50 mph. landing speed on either land or water.

► **Metal Construction**—Duck has all-metal hull, and metal-construction, fabric-covered wings with wingtip slots for maximum aileron control, and all-metal wingtip floats mounted high enough to avoid damage in normal airport taxiing. Landing gear, including tailwheel is fully retractable, with an auxiliary hand crank provided as emergency in event normal electric-powered retraction mechanism should fail. Plane is designed to takeoff from water under normal conditions with 1300 ft. run. Range is approximately 370 mi. with 30 gal. fuel tank. Spin characteristics and recovery are described as normal.

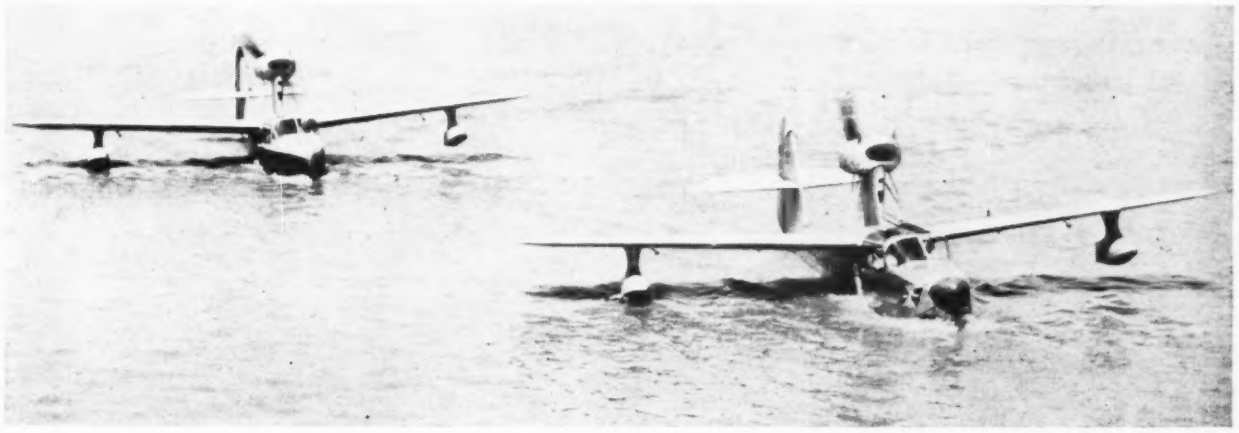
Standard equipment will include tires, single disc brakes, Pliocel fuel tanks, torsion rubber tail wheel assembly, all made by Goodyear; push-button electric starter, water anchor, retractable water rudder, basic instrumentation, two-way radio, map shelf, wheel control, and inflated seat cushion which will serve as life preserver.



FLIGHT CLOSEUP of Goodyear GA-2 Duck amphibian



CASTERING GEAR Duck takeoff in 90-deg. crosswind.



OATA Session Votes Five-point Program

Ohio Aviation Trades Association at its first convention in Bowling Green, Ohio, voted a five-point program for commercial airports and air safety conditions.

Meeting in conjunction with the Second Annual Ohio Aviation Clinic, sponsored by the State Aviation Board, OATA urged the Board to:

- Check plans for new commercial airports.
- Reject such plans if any existing airport is within three miles of a proposed site.
- Approve new airports only when there would be at least one runway not less than 1,800 ft. long with a glide path ratio of 10-to-1.
- Investigate feasibility of prescribing uniform rules for maneuvering aircraft on the ground.
- Require seaplane pilots to have proper CAA certification and to take off and land only in cleared areas where they will not endanger surface craft.

Supporters of aviation were cautioned against trying to "ram things down people's throats" when promoting new airports.

Hugh De Haven, head of the Crash Inquiry Research Institute at Cornell Medical College, New York, reported that amateur flyers could soon expect improved safety belts.

Police officers attending the Clinic's enforcement program were urged to clamp down on violators of the State's new flying regulations after they become effective Aug. 14.

John F. Guilmartin of the Chicago CAA office advised them to concentrate on low and reckless flyers, the most frequent violators.

Michigan Resumes Airmarking Program

Michigan's Department of Aeronautics has set a goal of airmarking 300 towns in the state this summer, and has already completed 25, Walter J. Carr, air navigation specialist of the department, reports.

The 300 towns, when airmarked, plus the 186 communities posted in 1946, will make the state even better marked than it was before the war.

By the time the war emergency made necessary obliteration of airmarkers throughout the country, Michigan had signs on 460 towns.

The signs are yellow, and are painted in letters 10 ft. high on the tops of large, flat buildings.

The state furnishes the paint and has two contractors in the field to do the work. If local groups wish to do the marking, the state supplies the paint and layout.

BRIEFING FOR DEALERS AND DISTRIBUTORS

FREE NAVION RIDES—Navion dealers are advertising to give away free rides, to businessmen who may be potential buyers of the four-place all-metal airplane, which has been adopted by Ryan Aeronautical Corp., San Diego, from the original parent, North American Aviation, Inc. The factory dealer advertising, appearing in hometown papers, offers the businessman a free business trip by Navion to anywhere within 150-mi. radius, and agrees to pick him up in the plane at the airport nearest his home or business. "All we ask in return is a few minutes during the flight to explain how the Navion costs no more than a car to drive, and how businessmen everywhere are finding that this easy-to-fly plane is a money maker for them," the advertisement continues. "We do want you to see for yourself what tremenous strides have been made in private planes since the war." If the advertising develops even a few good prospects, among businessmn who can get real utility out of the four-placers, and if the dealers screen the riders to eliminate those who are quick to try to cash in on such offers, but have no intention or ability to buy, the promotion promises to be well worth while.

DUCK FARMING—Goodyear Aircraft Corp., manufacturer of the three-place duck amphibian, which still isn't sure whether it wants to get its feet wet in the personal plane market or not, is getting about set to farm out a dozen Ducks to aircraft service operators. The idea is to let the operator fly the plane as if it were his own, using it in any type of aviation service he chooses and giving the plane a good general workout. First operator to be selected is due for announcement soon and might have received his plane before now, had it not been for delays caused by the GAC strike .

AERO MEDICAL DIEHARDS—Despite accident records since the liberalization of medical requirements for private pilots, which indicate that the physical examinations have very little if any bearing on the accident record, the Aero-Medical Association of the United States, composed of the physicians who used to make virtually all pilot examinations before the liberalization, is still blasting at CAA for letting down the barriers and making it possible for the less-than-perfect man to fly. In contrast, the non-Scheduled Flying Advisory Committee for CAA has recommended, and it is probable that CAA will soon adopt the practice of requiring only one physical exam for the student pilot, with no further examinations required, ever, at any time. Accident statistics indicate that the "hot pilots" who fly low and stunt, and the careless pilots who let themselves get caught in bad weather, cause many more accidents than any physical ailments or handicaps. In fact the physically handicapped pilots in most cases are among the safest, because they are naturally cautious, and because they usually have spent more time and effort in learning to fly.

BRITISH DISCOVER THE ERCOUPE—Recent issues of British aviation magazines indicate that our cousins have at long last discovered Fred Weick's excellent two-control spin-proof airplane, which after nearly two years of postwar production, is still the only airplane we know being marketed which can be soloed in four hours. The ecstatic writing of Stanley Bradshaw, in a recent issue of *Aeroplane* recalls some of that first glow which surrounded the Ercoupe in this country in its prewar era, but which has since, and for no good reason, been too much forgotten. The Briton extols the Ercoupe's taxiing performance which he says "would have turned a London taxidriver every shade of green, with envy". He is quite wide-eyed about the plane's ability "to crawl around in a turn with the nose to the sky, one wing well down, the wheel hard back, and the airspeed indicator fluttering only a little above the 40-mph. mark." After flying the plane himself, and finding the two-control system comes quite naturally, he concludes: "We need as much inherent foolproofness as can be built into the personal planes of today and tomorrow. When it can be achieved, as in the Ercoupe with so little sacrifice, if any, of normal handling characteristics, and so cheaply, then there is no excuse for this dogged pursuit of the old ways!"

KLENKE FORECAST—Bill Klenke, Stinson sales manager, predicts that personal plane business will taper off again this fall and winter after a good summer of sales much as the personal plane market reacted last year. So Stinson is planning to begin tapernig off production in July in line with this expectation, but will strengthen its retail sales organization in preparation for another seasonal upturn next spring. The Wayne, Mich., division of Consolidated Vultee Corp., for the first time in its 21 yr. now has over 300 retail sales and service outlets, which have sold more planes in the last six months than in any similar period in Stinson history, he reports. After a national tour of Stinson dealers, Klenke finds that they have in stock an average of less than one new plane to a dealer, but he predicts "difficult conditions" in the next few months for manufacturers and dealers who are overloaded on new plane inventory and short on working capital.

AIRPORT TITLE SUIT—Suit to acquire title to a privately operated airport, filed by the Minneapolis-St.-Paul Metropolitan Airports Commission, may be, as the commission says, to take over the airport and improve it in the public interest. But it is the kind of thing that airport service operators who believe in free and independent enterprises—and who object to government competition with private business—should watch very closely. If a municipality or its commission can take over any private airport, by a simple procedure of filing suit to claim it and paying off an appraised valuation, if offers a new opportunity for political grabbing. Probably the best way for the operators to handle such matters, or any other on a state or local government level, is by forming an aggressive and loudly vocal operators' organization which will investigate such actions and make its united influence felt in the interests of progress in aviation.

Alexander McSurely

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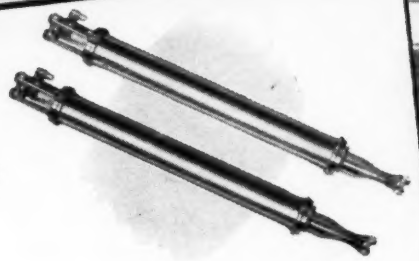

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FINANCIAL

Current Airline Merger Talks Unlikely to Result in Action

Analysis of Requirements Indicates Proposals Under Discussion Fall Short of Consolidation Qualifications.

Considerable speculation continues to shroud a number of airline merger discussions. It is known that exploratory talks have been going on between top airline executives and bankers. Presumably, Civil Aeronautics Board and other government officials have been apprised of tentative proposals. It is known, for example, that Chairman Landis is in favor of a number of airline mergers. The type of consolidation likely to receive Board sanction, however, is not of the variety that has been proposed thus far by the industry.

Current merger discussions are a normal outgrowth of a desire to correct many of the financial ailments plaguing the air carriers. Some observers maintain that if a weak carrier is combined with a strong one, greater stability of earnings will be introduced in the industry. The list of likely candidates to be consolidated with other lines includes Northeast, PCA, Colonial and Chicago & Southern. These carriers have experienced considerable difficulty in developing sustained earning power. Mid-Continent and Continental continue in their attempts to broaden their operations by acquisition of other properties. This entire group, interestingly enough, is in the "need" mail category. Expressing polite interest in absorbing other carriers are some of the larger lines including Braniff and National. It is conceivable that in any broad re-shuffling of airline properties, the trunk lines—Eastern, American, United and TWA—would become active participants in any consolidation moves.

▶ **Merger Talk Discounted**—Despite preliminary discussions and the obvious need for corrective action, the current wave of merger rumors may be largely dissipated long before it reaches the stage of seeking Board approval. Numerous mergers previously have been actively considered and a few have gone into the procedural mill of the Board. Thus far, the Board and its predecessor, the Civil Aeronautics Authority, have approved only two mergers or acquisition since 1938. This was the acquisition of Inland Air Lines by Western Air Lines and TWA's absorption of Marquette.

Prime requisite in the consolidation of air carriers is the strong community of interest and a definite logical route pattern. This obviously was present in the two instances named. The Inland properties may now be due for another change and may represent the only significant airline acquisition developing out of current proposals likely of consummation. Industry observers are awaiting outcome of the Board's decision in passing upon the proposed purchase of the Denver-Los Angeles route by United from Western. If approved, this should be the signal for the sale of the Inland Division to another carrier. Under the new regional concept now being pursued by Western, confining its operations west of the Rockies, the Inland routes would no longer fit into the pattern. Continental, Mid-Continent, United and Northwest may be expected to become very much interested in the disposition of the Inland routes.

▶ **Requisites**—The desired attributes are not always present in proposed airline consolidations. For example, the American Mid-Continent merger was turned down by the Board as it would merely add to the former's bigness and there was no demonstrated community of interest. The proposed PCA-Northeast merger was withdrawn voluntarily after it was well along in the Board's procedural mill. The announced reason for dropping this proposal was attributed to the deteriorating financial condition of both carriers. However, if the proposal was sound in the first instance, here was an opportunity to place in effect the benefits originally claimed and thus introduce earning power stability to the combined system.

One of the greatest stumbling blocks to airline mergers always has been the strong individual personalities at the head of the respective lines. The question of who would emerge as the dominant force in any new combine has never been quite solved. It is possible, however, that economic forces may force a number of involuntary adjustments.

▶ **Financial Considerations**—One of the main benefits ascribed to larger corporate organizations and thus a factor in favor of fewer individual airlines is the increased financial stature. Credit can be obtained and securities can be sold with greater ease and at lower cost by a large organization than by a small company with limited resources. Administrative and other overhead burdens can be spread over a broader base and volume of business. Economies of larger purchases can be effected. Increased economies of operation become possible through a host of avenues.

The same factors that appear to favor general corporate enterprises pertaining to relative size, however, may not operate always in the air transport industry. For example, assuming a proposal for combining Eastern and Northeast was advanced. If this was approved, Northeast's mail compensation, which currently approximates $15.50 per ton mile, would no longer prevail but would be consolidated in Eastern's system-wide rate of 45 cents a ton mile. Another factor constantly stressed in advocating mergers is the desirability of giving a carrier a longer haul. It is quite true that this is a very important element but far from controlling. For instance, TWA has the longest average passenger haul and PCA the shortest, yet both carriers are high-cost operators.

▶ **Earnings Level Important**—The coming level of earnings this fall may exert considerable pressure toward more logical consolidation patterns. This can take force through dual circumstances. A weak airline on the verge of going under will have to submerge its personalities, thus removing one of the previously existing type of obstacles. Further, a strong carrier, eyeing the acquisition of an airline going through rough financial weather, obviously sees an opportunity to reduce the purchase price by patient waiting.

Despite the character and type of mergers that may be advanced later this year, it will be well to refrain from any conclusions until the CAB officially passes its approval. Much can happen in the interim. It will be recalled that during the American Mid-Continent and PCA-Northeast merger stages, talk was rife that the Board would apprave such proposals without delay. Investment house analyses made bland assumptions as if these consolidations were an accomplished fact. Further, the PCA-Northeast combination was even recommended for approval by a Board examiner, but never materialized. Moreover, even if approved, the terms of the exchange of securities or purchase price are subject to adjustment by the Board.—**Selig Altschul.**

West Coast Strike Threats Receding

West Coast industry-wide strike threats weakened materially when Douglas, North American and Northrop fell into line with the wage raise pattern set by Lockheed at the start of the month.

The three Los Angeles major employers offered 5-cent per hour raises to hourly workers and comparable inceases to salaried employees.

There could be little doubt that (with the exception of Northrop, which was not confronted with a walkout threat) they felt they had been forced by the Lockheed wage boost to abandon earlier plans to permit strikes rather than yield to union wage demands.

Douglas unionists accepted the nickel raise offer, and the company's resultant wage increase order will benefit the majority of 15,000 employes at Santa Monica, 6,000 at El Segundo, and 2,000 at Long Beach plants.

North American's CIO union at mid-week was "considering" the wage offer for its several thousand members while the balance of the Company's 13,691 employees were given salary increases.

Domestic, Trans-Atlantic Carriers Show First 1947 Operating Profit

Industry's improved earnings during April make only small dent in huge deficit for first quarter; Eastern continues to set pace.

By CHARLES ADAMS

With Eastern Air Lines continuing to furnish most of the power, the domestic air transport industry during April pulled out of the financial woods for the first time this year.

Nine of the 16 scheduled airlines continued their first three months' losses into the second quarter. But overall operating profit for the industry, bolstered by Eastern's impressive $1,306,964 income, was $393,315.

▶ **Small Dent**—The improved showing in April makes only a small dent in the whopping $18,746,182 operating deficit during the first quarter. Moreover, the April profit of $393,315 was still substantially behind the same 1946 month, when the same carriers earned around $470,000. Cumulative first four months figures show the domestic airlines with an $18,352,867 operating deficit in 1947 compared with a $4,026,755 loss in the same 1946 period.

U. S. flag carriers on the trans-Atlantic run shared in the April financial gains. Balancing American Overseas Airlines' $304,666 operating loss were a $385,289 operating profit by Pan American Airways' Atlantic Division and an $88,338 profit by TWA.

▶ **Feeders Gain**—The six feeders active during April pared their losses from the high level of the first three months, but with the exception of Pioneer Air Lines remained in the red. Pioneer earned $28,352 on operations in April, largely because of a recent CAB order which gave the carrier 60 cents a plane mile mail compensation for the period September, 1946, through May, 1947. Other feeders' mail pay is still at the 35 cents a plane mile temporary rate.

Adjustments in mail compensation have resulted in a gradual trimming of air carrier losses from original figures issued by CAB for 1946 and undoubtedly will shave the 1947 losses similarly. Example of a complete reversal in a company's financial position was seen last year when Northeast Airlines finished 11 months with a $254,000 net loss that changed into a 12-month operating profit of $190,707 following a retroactive mail pay boost.

▶ **Western, PCA Profit**—Mail pay adjustments this spring have resulted in the rather unusual position of Western Air Lines and Capital Airlines (PCA), two of the high-deficit carriers last winter, in the profit column this spring. PCA reported $48,003 operating income in April and $89,789 operating income in May against a first quarter loss of $2,215,000. Western earned $31,886 in April against $668,000 operating loss for the first quarter.

Other April operating results, with first quarter figures in parentheses, are:

American, $75,690 profit ($4,684,686 loss); Braniff, $51,742 loss ($582,744 loss); Chicago & Southern, $28,044 loss ($523,700 loss); Colonial, $73,250 loss ($411,314 loss); Continental, $29,744 loss ($257,506 loss); Delta, $149,200 profit ($279,807 loss); Eastern, $1,306,964 profit ($1,664,898 profit); Inland, $4,884 profit ($66,963 loss); Mid-Continent, $32,119 loss ($99,906 loss); National, $98,835 profit ($347,584 profit); Northeast, $84,618 loss ($499,860 loss); Northwest, $324,727 loss ($1,898,490 loss); TWA, $384,329 loss ($3,437,791 loss); and United, $313,574 loss ($5,131,595 loss).

AOA Leads Field On Atlantic Run

American Overseas Airlines, in marking the fifth anniversary of its trans-Atlantic service, has claimed pre-eminence among the eight carriers flying the U.S.-Europe run.

The carrier reports operating more trans-Atlantic flights and furnishing more seats for Europe-bound passengers than its five foreign-flag competitors combined (Air France, KLM, BOAC, SABENA and Scandinavian Airlines). American Overseas states that it is providing approximately 32 percent of the seats offered by all trans-Atlantic carriers, U. S. and foreign.

▶ **24 Roundtrips**—Under its present schedule, AOA operates 24 round-trips weekly to Europe, compared with a combined total of 20 roundtrips offered by foreign-flag airlines. Other American carriers fly 32 roundtrips weekly, making an overall total of 76 roundtrip flights, or 2,657 seats each way, between the U. S. and Europe.

In contrast to the pair of Vought-Sikorsky flying boats with which operations to Foynes, Eire, were begun June 20, 1942, AOA now uses 10 DC-4s and seven Constellations. Eight Boeing Stratocruisers are to go into service early next year. Employment has grown from 336 in 1942 to 3,685 today, including 1,437 stationed abroad.

During the last five years, American Overseas has flown 68,275 passengers 331,250,000 passenger miles. It has carried nearly 2,000,000 lb. of cargo and 2,337,500 lb. of mail between the U. S. and Europe.

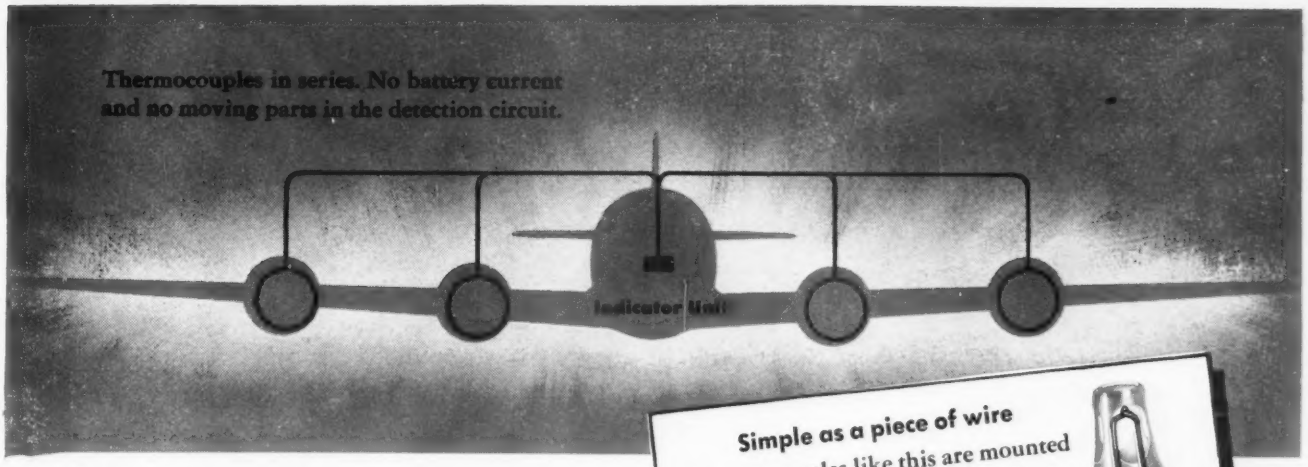
▶ **Record Business**—AOA handled a record of 844 eastbound passengers during the first week of June, achieving a 99 percent load factor. Last minute cancellations prevented filling 10 seats. Westbound traffic was approximately as heavy. The carrier reports that it has received sufficient advance reservations to assure capacity loads for almost every trans-Atlantic flight between now and October.

PAA Again Protests Atlantic Route Pattern

Pan American Airways has extended its series of protests against the existing allocation of U. S. flag air routes to Europe with a new request that CAB modify its North Atlantic case decision of June, 1945. The carrier, in asking for a certificate amendment authorizing service to Paris and Rome, said there is now ample experience to show that the pattern set up in the North Atlantic opinion should be changed.

TWA has a "practical monopoly in France and Italy as far as American flag competition is concerned," PAA declared, adding that by virtue of its favored position, TWA was able to secure 3,010 eastbound trans-Atlantic passengers and 254,000 lb. of eastbound mail between Jan. 1 and Apr. 13, 1947, against 1,798 eastbound passengers and 145,000 lb. of eastbound mail for PAA. Citing large westbound passenger backlogs at Paris and Rome during the winter, Pan American said TWA had been unable to handle the volume of traffic available to it in its "monopoly territory."

PAA noted that because of the lack of landing rights in the Balkans it was obliged to fly from London over France and Italy to Istanbul, Turkey, without a traffic stop. The carrier proposed that in exchange for authority to serve Paris and Rome for three years on the London-Istanbul link its operations beyond Lisbon on the New York-Lisbon-Barcelona-Marseilles route be suspended.



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How EDISON thermocouple fire detection meets ideal requirements

[ITEM VIII-A-1 OF REPORT NO. 2 *of Aircraft Industries Association ARC Subcommittee on Aircraft Fire Detection, Airworthiness Project No. 7, dated May 27, 1946, lists requirements for the ideal fire detector. See how the performance of the Edison system compares with these ideal requirements.*]

The IDEAL Detector (From ARC Report)

"a. Should be ruggedly constructed so as to resist exposure to gasoline, oil, dirt, water, vibration, fatigue, salt air, and handling.

"b. Detector circuit should require no current until the actual alarm has signalled, unless a supervisory system is used.

"c. It should fail safe, i.e., in case of circuit failure it becomes inoperative rather than give a false alarm.

"d. A test button should be provided to check the entire system.

"e. There should be no moving parts in the circuit.

"f. The detector should be able to withstand more than one fire without having to be replaced or calibrated.

"g. The detector should indicate when the fire is extinguished."

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c. Should a thermocouple circuit fail, it could send no signal . . . couldn't give a false alarm.

d. The push of a button checks the entire Edison system.

e. There are no moving parts of the system in the fire zones. The only moving parts are the relay contacts located in the signal system.

f. Thermocouple detector will withstand many fires without need for replacement or calibration.

g. A thermocouple detector signals "FIRE OUT" and is again ready to signal "FIRE" after conditions return to normal.

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Robinson to Argue Regional Airline Concept Before CAB

New York intrastate carrier points to high traffic generation from small cities; Sees better, cheaper service than feeders can provide.

A two and a half year struggle for certification by one of the Nation's few year-around intrastate carriers enters its last stages this week when Robinson Airlines, Ithaca, N. Y., appears before CAB in oral argument on the Middle Atlantic area case.

Now boasting the highest traffic volume and load factors since starting flights in April, 1945, Robinson will try to convince the Board that its unique "regional" service will generate more business at less cost than any other non-trunkline type operation. The carrier contends that its own experience has shown that small cities are able to support a line that provides frequent nonstop, high-speed service to surrounding metropolitan areas, but that the same communities can furnish little traffic for the infrequent local schedules of the trunklines or the comparatively slow, grasshopper-like feeder operations.

▶ **Cities Form Hub**—Robinson uses Ithaca and the nearby triple cities (Binghamton, Endicott and Johnson City) as a hub. This hub area is linked to the three metropolitan centers with which it has the greatest community of interest—Albany, New York and Buffalo.

After dropping to a low of 38.8 percent last January, Robinson boosted its load factor to 61.7 percent in April. May load factor rose to 66.2 percent, and the preliminary figure for the first half of June was 68 percent.

▶ **Traffic High**—By contrast, the six certificated feederlines operating during April showed load factors ranging from 14 percent to 48 percent. Robinson's revenue passenger miles for April—315,007—were exceeded by only two of the certificated feeders, Pioneer and Southwest.

During May, Robinson's four nine-place Beech D-18S transports carried a record 2,096 revenue passengers 342,252 revenue passenger miles. Eighty-six percent of the scheduled mileage was completed.

▶ **Ithaca Results**—To support its contention that a regional airline can tap the full traffic potential of small cities, Robinson points to its experience in Ithaca, a community of 20,000 plus 10,000 Cornell University students. More than 50 percent of the airline's traffic originates or terminates at Ithaca, with weekly passengers recently averaging about 260 and reaching a peak of more than 300.

The remaining traffic, with few exceptions, originates or terminates in the triple cities, which have a combined population of about 115,000. Only an occasional rider passes through the Ithaca-triple city hub enroute between New York and Buffalo or New York and Albany since this service is furnished by the trunklines.

▶ **Deficit Persists**—President C. S. Robinson frankly admits his carrier is not making money despite the impressive load factors and an 8-cents-a-plane-mile passenger fare, somewhat higher than the feeders charge. However, he asserts positively that the company could make money as a certificated operator if granted the same mail pay of 35 cents a plane mile which the feeders are being paid now and consider inadequate.

Without mail pay, Robinson believes an 80 percent load factor will be necessary to break even with D-18S equipment. Certification would also permit carriage of passengers and cargo originating in or destined for other states. Robinson must now refuse this business.

▶ **Costs Given**—Total operating costs with the Beechcraft have been running around 45 cents a plane mile, according to Robinson. The airline employs 66 persons, a ratio of 16.5 per operating plane, and has an organized traffic and public relations department, station personnel, porters, limousine drivers, an accounting department and a company engineer.

Operations department consists of 14 captains and co-pilots, plus two reserve captains holding other positions in the company. A flight dispatching section at Ithaca is headed by a licensed meteorologist and dispatcher maintaining weather teletypes and two-way VHF radio contact.

▶ **Low Utilization**—The flying day runs from 7 AM. to 8 PM. Three maintenance shifts are required, with the majority of work being done at night. The carrier's shops handle all but major engine overhauls.

Robinson says the low ratio of employes to planes more than offsets the low ratio (by trunkline standards) of aircraft utilization, which now exceeds 6.5 hours daily. Somewhat lower plane utilization than that of the trunklines is inherent in the regional concept, which involves peak traffic loads during the morning and evening.

▶ **Surface Competition**—Although charging 8 cents a mile, Robinson's fares are reasonably close to those for railroad pullman transportation. Because of mountainous terrain, railroad distance between New York and Ithaca is 320 miles against 170 miles by plane. Buffalo, New York and Albany—all within 90 minutes of Ithaca and the triple cities by Robinson Airlines—are up to seven hours away by surface transportation.

▶ **Frequent Schedules**—Robinson offers Ithaca and the triple cities four roundtrip flights daily to New York, and two roundtrips daily to Albany and Buffalo. An extra flight to New York is made on Fridays and Sundays.

▶ **Terminal Shift**—At present, Robinson uses Roosevelt Field as its New York terminal, but it plans to shift to the Teterboro, N. J., airport if certificated. By the middle of September, the carrier hopes to have its own airport—with two 3,800-ft. runways—completed on a site four miles from the heart of Ithaca.

The carrier's certificate application, filed in 1944, contemplates nonstop service from the Ithaca area to Rochester and Washington, D. C., in addition to the cities now being served.

Airline Passenger Traffic Up 16 Percent

Scheduled carriers, including feeders, report 720 planes in use; cargo volume rises.

Airline passenger traffic during the first four months of 1947 ran about 16 percent higher than the record-breaking levels of the corresponding period in 1946, but the gains have continued to lag behind the 25-50 percent increases forecast by industry traffic officials last December.

Revenue passenger mileage reached 1,781,109,000 in the first third of 1947 compared to 1,531,784,115 for the same period last year, the Air Transport Association reports. All other traffic categories except air mail showed marked gains in spite of weather conditions described as the worst in air transport history.

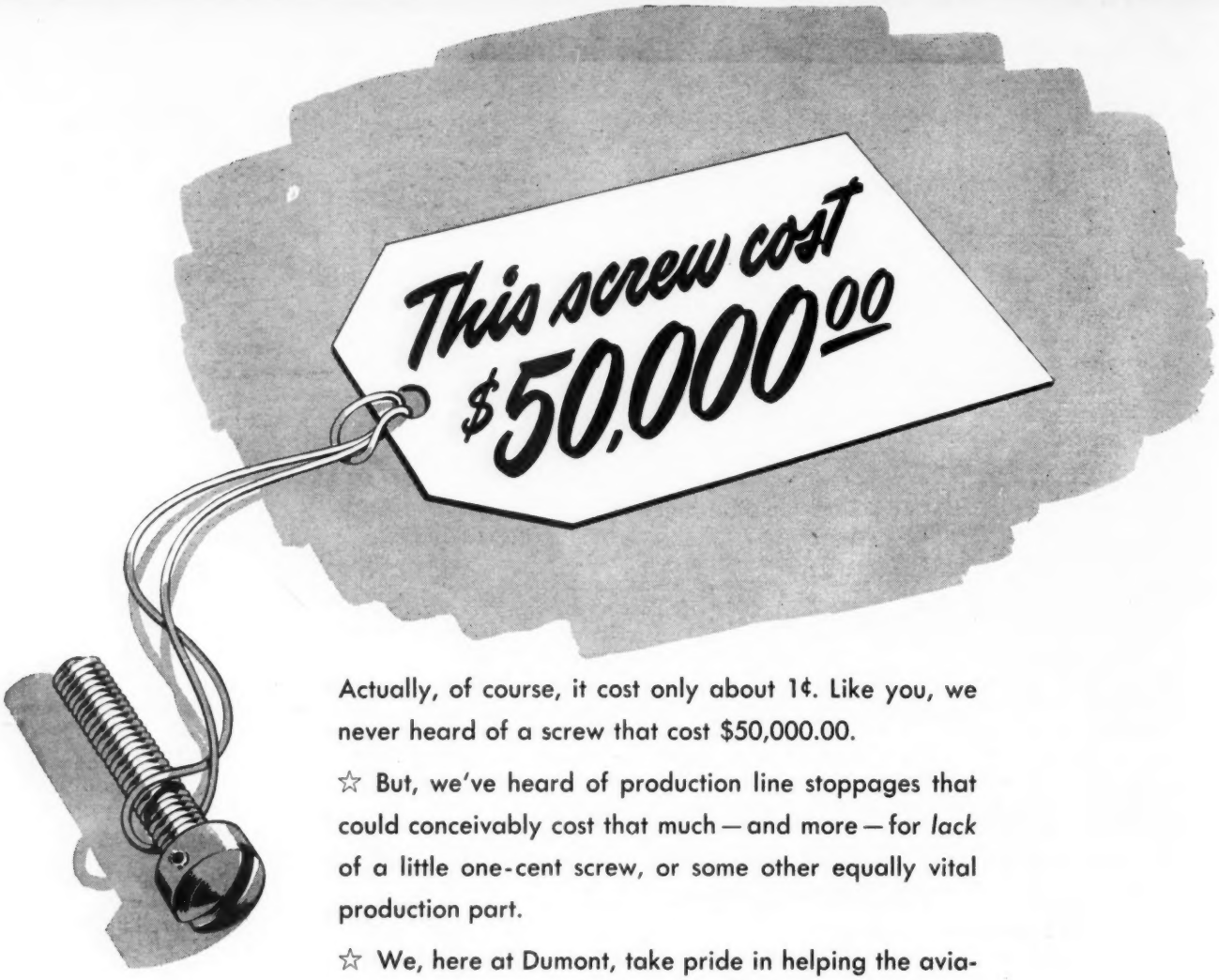
▶ **Cargo Gains**—Airfreight jumped 294 percent to 8,356,011 ton miles from 2,119,135 in the first four months of 1946. Air express increased 57.5 percent to 9,295,403 ton miles from 5,901,437, while revenue plane miles flown rose 11.4 percent to 99,359,208 from 89,159,214.

At the end of April there were 171 more aircraft in scheduled domestic service than a year ago, ATA said, and available seat miles for the first four months were up 52 percent.

Following a record 250-plane increase in 1946, 29 aircraft were added during the first third of 1947. In May, 27 more planes, mostly DC-6s and Constellations, were acquired, bringing the total fleet of the scheduled airlines to 720.

▶ **Feeders Included**—Included in the equipment total are 40 planes operated by feeders and All American Aviation on its pickup route. As of June 1, Pioneer Air Lines was using six planes; Southwest, nine; Challenger, three; Empire, four; Florida, three; Monarch, four; West Coast, two; and All American, nine. Traffic figures also cover feeder operations.

The increased seat capacity on the scheduled airlines, which resulted in the dropping of passenger load factors to a postwar low of 58.8 in February, began to fill up late in March. April load factor was 72.8.



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Northrop Reconsiders Pioneer Plane Project

Further development hinges on TACA refinancing, former Northrop official says.

Whether Northrop Aircraft will go ahead with development of its three-engine Pioneer rests largely upon whether TACA Airways, principal potential customer, is able to obtain refinancing, it has been indicated by LaMotte T. Cohu, former Northrop General Manager now President of TWA.

In testimony before CAB on his position as a director of both Northrop and TWA, Cohu disclosed that the manufacturer is not now building any more Pioneers and that the project may be abandoned. After stating that TACA was interested in buying, but didn't have the money, he added, "If TACA gets refinanced, I think Northrop will carry on the investment. If it doesn't, they probably will abandon the plane."

▶ **Changes Being Made**—The company still is not satisfied with the prototype of the plane especially designed for needs such as TACA's in getting in and out of small, rough primitive landing areas, Cohu disclosed. The tail of the airplane and the wings are being changed.

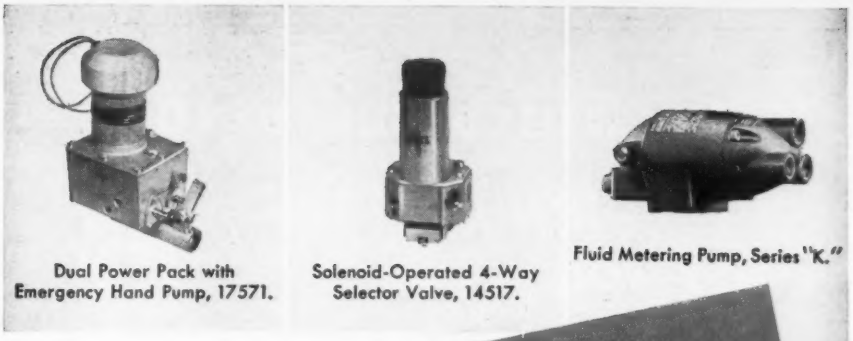
Despite the fact that the Pioneer was conceived primarily for foreign use, some interest in it has developed as a possible feedliner for U. S. use. Commenting on this, Cohu said "If you were going to design an airplane for feeder use in this country I think you could design a better one than the Pioneer. But it does appear to be as good or better than anything that is available at the present time."

▶ **Turbine Engine Work**—Cohu also gave an insight into Northrop's work on aircraft gas turbine engines, which it has been carrying on jointly with Joshua Hendy Iron Works through Northrop-Hendy Co. Four engines have been built, two of which have "blown up in tests." Northrop has high hopes for the future of its jet engines, with its turboprop developing 9,000 hp.

The company has no present plans for developing a commercial version of its big XB-35 flying wing bomber, Cohu disclosed. He estimated it would cost about $10,000,000 to make it commercially usable.

Competition Study Set

Harvard University School of Business Administration will make a study on "Competition in Air Transportation" under direction of Prof. George P. Baker, former member of CAB. F. W. Gill, formerly with American Airlines, will head the project's staff and will be assisted by Gilbert L. Bates, formerly with PCA, and Sam F. Stone, formerly with Pan American Airways.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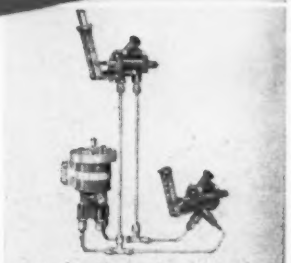
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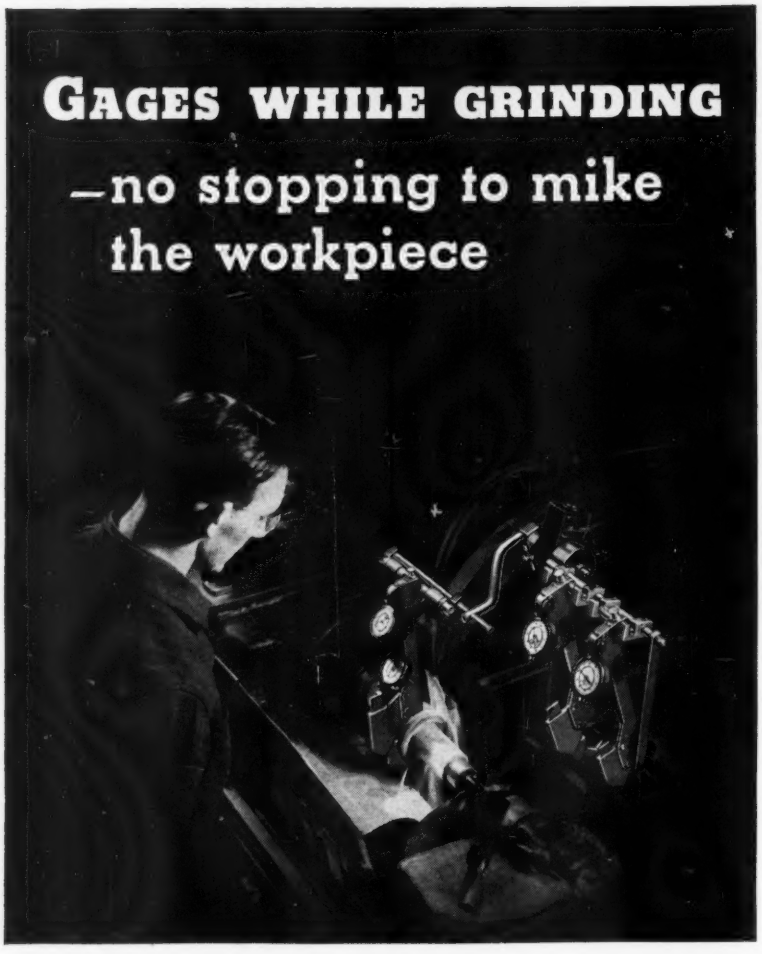

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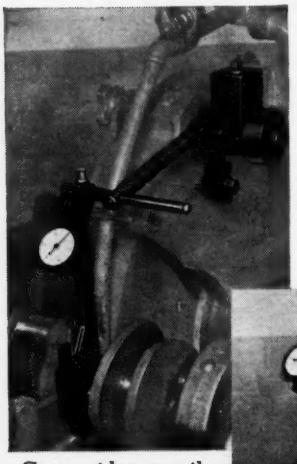

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Mountain Leaves TWA for I T & T

Joseph D. Mountain, TWA captain and former AAF colonel who for the past year has headed the airline's all-weather flying committee, has resigned to become special assistant to the vice-president of International Standard Electric Co., an International Telephone & Telegraph Corp. subsidiary.

In his new post, Mountain will supervise the development, manufacture and exploitation of automatic reservations equipment and similar devices. He also will supervise all flying activities of I. T. & T. and its associated companies.

Work originally carried on by TWA's all-weather committee henceforth will be coordinated by the carrier's Director of Operations Engineering, J. E. Harrington, in conjunction with the operations departments of the airline's transcontinental and international divisions.

Other personnel developments:

▶ **American**—Has appointed G. J. Brandewiede to head its new Materials Department and has named John G. Deater as Company Personnel Director. Former Director of Sales for Curtiss-Wright Corp., Brandewiede will have control of materials purchasing, warehousing, inventory control and surplus sales. Deater replaces Louis A. Traxel, who resigned.

▶ **American Overseas**—Kenneth Murdoch, assistant secretary, has been appointed Director of Planning to succeed H. Danforth Starr, who recently was elected secretary-treasurer. Murdoch will continue as assistant secretary. Thomas O. English and Grant Titsworth have been elected assistant treasurer and assistant secretary, respectively. Thomas J. Harris, formerly American Airlines' New York cargo sales manager, has been named European cargo sales manager for AOA.

▶ **Eastern**—Malcolm F. Plaeger, formerly station manager at Corpus Christi, Tex., has been appointed station manager at Birmingham, Ala.

▶ **Mid-Continent**—W. C. England, for the last year assistant to the director of public relations, has been named district traffic manager at New Orleans.

UAL Eyes Faster Coast-Coast Run

United Air Lines will go into direct competition with American and TWA between New York and Los Angeles July 14 when it inaugurates new one-stop DC-6 service between the East Coast and So. California.

Preliminary schedules filed with CAB indicate that UAL will try to better both American's and TWA's time on the eastbound run. All-daylight service is planned initially, with flights leaving westbound from New York at noon and eastbound from Los Angeles at 8:25 A. M. Only intermediate stop is Chicago.

Prior to a CAB decision May 19 consolidating the Carrier's transcontinental AM 1 with its West Coast route, AM 11, all of United's transcontinental traffic originating or terminating at Los Angeles had to stop at San Francisco or go via Western Air Lines' cutoff. The routing via San Francisco is 450 miles longer than the new direct New York-Chicago-Los Angeles link.

United was slated to start DC-6 service from Washington to San Francisco via Chicago last week.

Other new services:

▶ **BOAC**—Opened a new weekly service between Poole, England, and Hong Kong via Cairo, Bahrein, Karachi, Calcutta and Bangkok recently with 22-passenger Plymouth flying boats. The operation supplements a weekly schedule conducted with Hythe flying boats. BOAC plans to replace all Hythes now in service on its Far Eastern routes with the new two-deck, 28-ton Plymouths, nine have been ordered.

▶ **TWA**—Was slated to start Constellation service into Cincinnati last week. First nonstop New York-Cincinnati flights were to begin at the same time. Carrier intends to inaugurate service to Wilmington, Del., and Allentown-Bethlehem, Pa., around Aug. 1 and to Valle Airport, Ariz., in the Grand Canyon area, this week.

▶ **American**—Started nonstop DC-6 service between New York and Cincinnati early this month.

▶ **Northwest**—Was to begin serving Eau Claire, Wis., last week.

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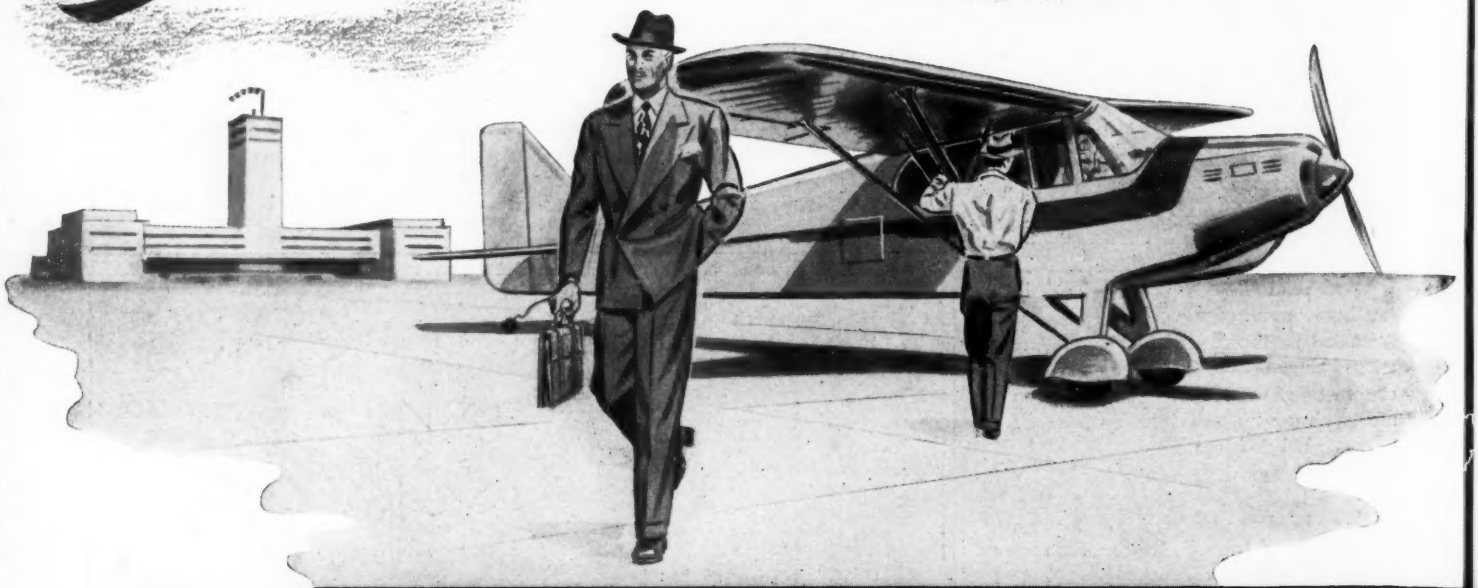

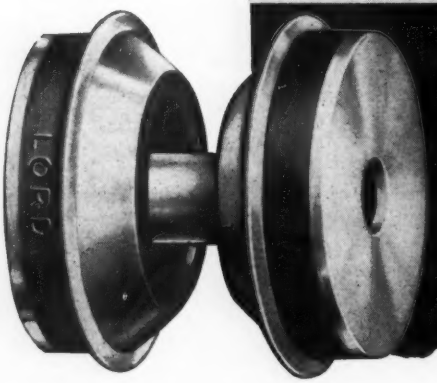

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Colonial Again Loses Bid For Latin America

Colonial Airlines has lost again in its bid for a route to Latin America. CAB has denied the carrier's petition for reconsideration of a Board decision in May (AVIATION NEWS, June 2) which failed to authorize one-carrier service from large East Coast cities to the Canal Zone.

The May opinion had reaffirmed the stand taken by the Board a year ago in the Latin American case, when applications of Colonial, Eastern and National for through service between points in Eastern U. S. and Balboa, C. Z., via the West Indies were turned down. Colonial was encouraged to file the petition for reconsideration of the May decision by CAB Member Josh Lee's dissent urging that the carrier be given a route from the co-terminals New York-Washington-Philadelphia-Norfolk to Balboa via Charleston, Nassau, Camaguey, Kingston and Barranquilla.

Philippine Air Lines Gets Route to San Francisco

Philippine Air Lines has been granted CAB authorization to operate between Manila and San Francisco via Honolulu. In issuing the foreign air carrier permit, the board noted that PAL had been designated for the service by the Philippine government, with which the U. S. signed a bilateral air transport agreement last November.

PAL has been flying the trans-Pacific run under contract since last July, using DC-4s supplied and manned by Transocean Air Lines. The Philippine carrier recently purchased Far Eastern Air Transport (Aviation News, June 9) and intends to place DC-6s in trans-Pacific service this fall.

In addition to its U. S. operation, PAL flies Inter-Island in the Philippines and to China, Singapore and Bangkok.

Insurance Paid

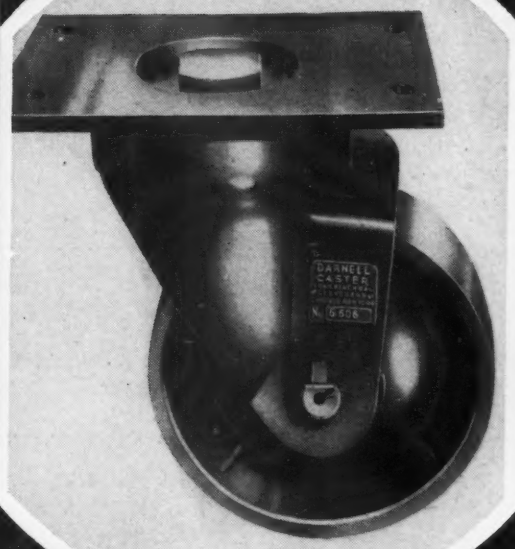
Twenty-eight airline trip insurance policies totaling $285,000 were purchased by passengers aboard the United Air Lines, Eastern Air Lines and Capital Airlines DC-4s which crashed in May and June.

Associated Aviation Underwriters, New York, which sells a $5,000 round-trip policy for 25 cents at all airline counters, reports it has already paid most of the beneficiaries.

POA-Siam Starts Service

Pacific Overseas Airlines-Siam has started DC-4 flights between Bangkok, Shanghai, Manila and the West Coast. Until a foreign air carrier permit is granted by CAB, the company will operate on an irregular basis, using American crews under a contract with Pacific Overseas Airlines, Ontario, Cal.

DARNELL CASTERS



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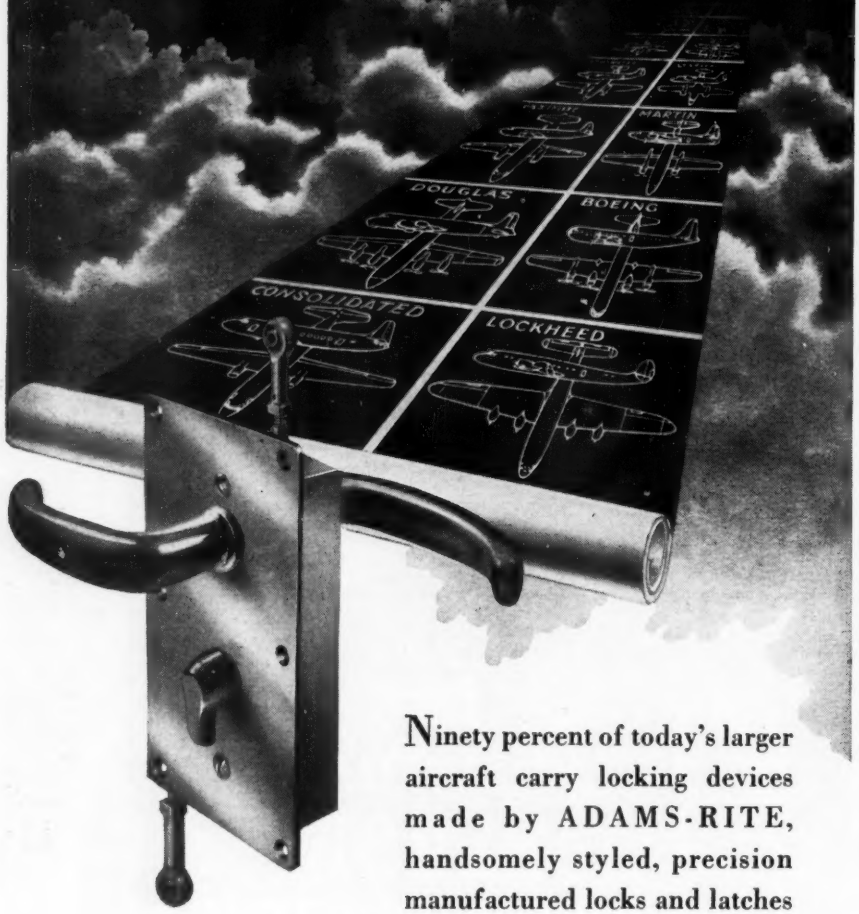

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Aleutian Route Urged

CAB examiners have urged the Board to grant Reeve Airways, Anchorage, Alaska, a five-year certificate to carry persons, property and mail between Anchorage and Attu Island in the Aleutians via Cold Bay, Dutch Harbor, Umnak Island, Atka Island, Amchitka Island and Shemya Island. Irregular service to the Pribilof Islands was recommended.

Shortlines

▶ **Air France**—Marked the first anniversary of its New York-Paris service by increasing trans-Atlantic schedules from four to five weekly. Daily service is planned before the end of summer. Carrier is booked almost solid through July and part of August.

▶ **American Overseas**—Has inaugurated weekly trans-Atlantic all-cargo service with DC-4s.

▶ **Capital**—Increased its passenger revenue from a low of $684,000 in January to $1,341,000 in April and $1,571,000 in May.

▶ **Colonial**—Has appointed F. D. Benham and Larry Nixon as public relations counsel.

▶ **Linea Aeropostal Venezolana**—Is standardizing on Constellation equipment for overseas operations following the sale of its two remaining C-54s to Colonial Airlines for use on the latter's Bermuda run. As part of the transaction, LAV took two of Colonial's DC-3s and will use them on domestic Venezuelan routes. LAV now has two Constellations operating between Caracas, Havana and New York, and two more Connies are on order for late summer delivery.

▶ **Northwest**—Around Sept. 1 will move its western region offices from Boeing Field, Seattle, to the new Seattle-Tacoma Airport, where the company is completing a $1,213,000 hangar.

▶ **Pan American**—Has announced new quantity air express rates providing reductions up to 50 percent throughout the Alaska region.

▶ **Scandinavian Airlines System**—Has received Uruguayan authorization to establish a commercial service between Sweden and Uruguay.

CAB SCHEDULE

July 7. Oral argument in Middle Atlantic States Area Case. (Docket 674 et al.)

July 7. Prehearing conference on Pan American's Latin American Route Consolidation Request. (Docket 2811.)

July 10. Prehearing Conference on TWA's AM 2 and AM 58 Route Consolidation Request. (Docket 2581.)

July 16. Prehearing conference on Resort Airlines' "All Expense Tour" Certificate Application. (Dockets 2377 and 2571.)

July 21. Hearing in All American Aviation's Mail Rate Case. (Docket 1906.)

July 28. Hearing in Chicago Helicopter Case. Postponed from July 14. (Docket 2384 et al.)

Aug. 25. Hearing in case involving additional service in California-Nevada area. Postponed from July 17. (Docket 2019 et al.)

Sept. 2. Hearing in Latin American Certificate Amendment cases of Panagra and Braniff. (Dockets 2527 and 2622.)

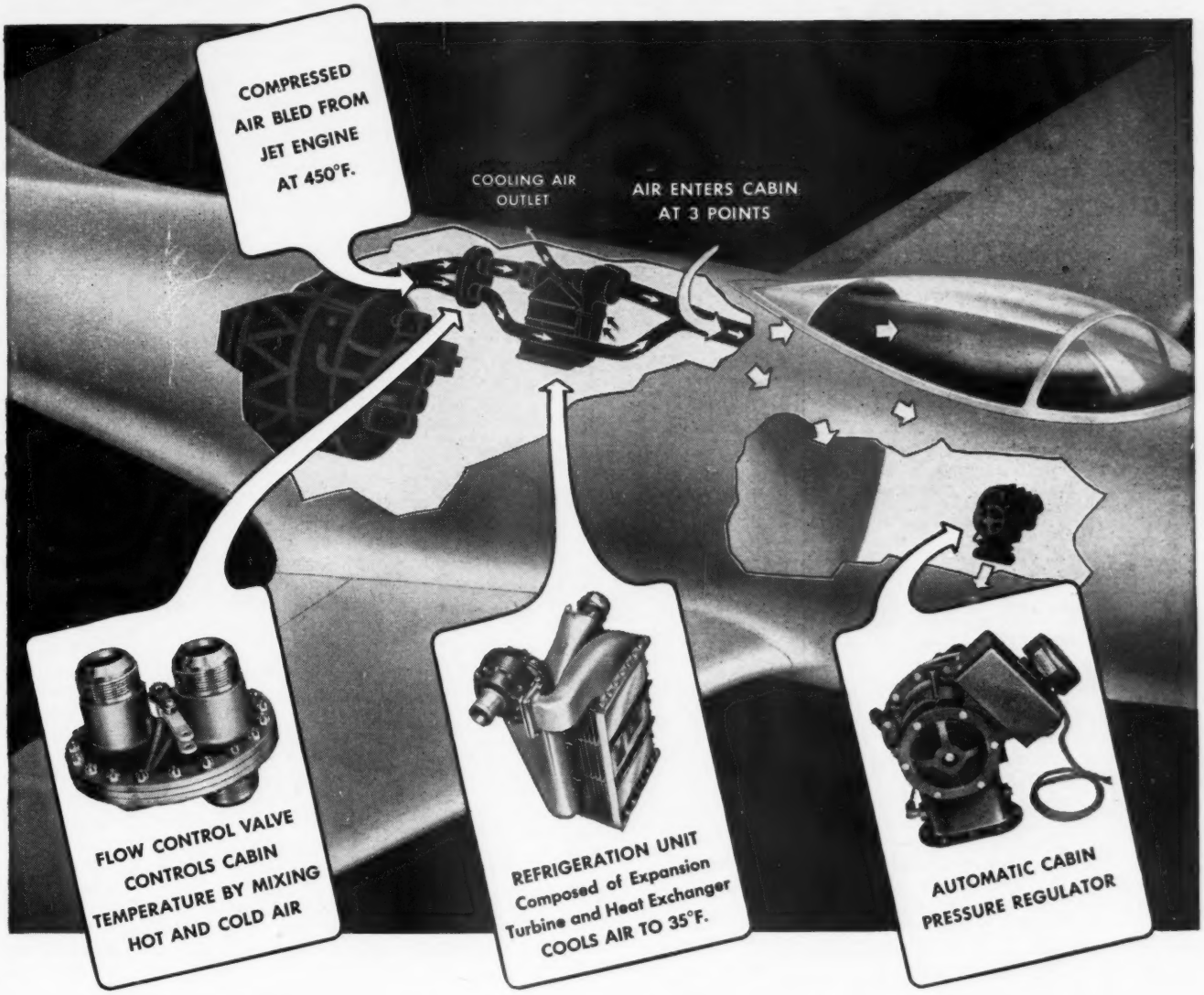
Sept. 8. Hearing on Mid-Continent's proposed service between Minot, N. D., and Regina, Saskatchewan. (Docket 628.)

Sept. 29. Hearing on Mid-Continent's application for alternate Kansas City-New Orleans Route. (Docket 1956.)

Oct. 7. Hearing involving additional Florida Area Service. Postponed from Aug. 12. (Docket 1668 et al.)

Nov. 15. Hearing on Board's Investigation of Consolidated Airfreight Tariff Agreement. (Docket 2719.)

"Cabin Comfort" for Jet Fighters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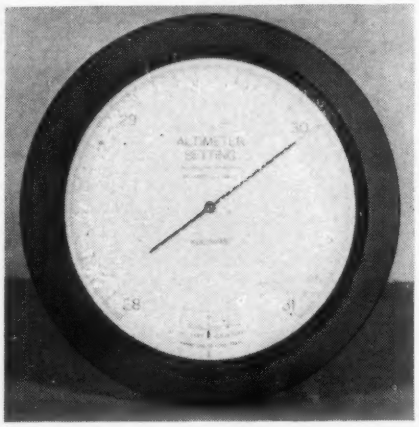

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Precipitation static in aircraft communication is reported largely overcome with use of insulated aircraft antenna wire developed by **Federal Telephone & Radio Corp.,** Clifton, N. J. Designated Intelin Type K-1064, new wire gains its effectiveness by shielding of actual conductor with a jacket of polyethylene insulation. Wire has tensile strength of 127,000 psi. minimum.

New Heavy-Plane Brake Drum

Greater safety and economy are reported for new type heavy-aircraft brake drum developed by **Copperweld Steel Co.,** Glassport, Pa. Drum has friction surface of special wear-resisting alloy steel and an outside layer of copper with copper fins. High thermal conductivity of copper rapidly dissipates friction-generated heat to atmosphere, at same time helping to maintain more uniform temperature over entire brake drum surface. Company states one major airline is now equipping its DC-3s with new drums, which will be marketed in aircraft field through The B. F. Goodrich Co.

Summer Coat for De-Icers

Protection against destructive aging of de-icer rubber during hot weather—making it unnecessary to remove, wrap, and store de-icers during summer—is announced by **The B. F. Goodrich Co.,** Akron, Ohio. New development is a thin, rubber-like "summer film" which can be easily applied over rubber boots during hot weather, then readily stripped off when icing season returns. Filmed de-icers can still be operated if unseasonal icing conditions are encountered.

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Marketed through **Aircraft Fuel Equipment, Inc.,** 790 Washington St., Anthony, R. I., is Jiffy aviation fueler, all-weather vehicle built on chassis of Universal Jeep. Equipped with 200-gal. tank, oil supplies, fire extinguisher, and standard safety devices, fueler is designed to service all types of light and medium size planes. Specifications: Pump, Granco, 1½ in. with bypass (35 gal. per min.); air release unit, Bowser, 1¼ in. piped to dome of tank to avoid overboard fume discharge; micron filter, Bowser; meter, Bowser, Exacto, calibrated in tenths; hose, 25 ft. standard bonded ¾ in. gas hose with couplings; nozzle, standard, equipped with 100 mesh screen with inlet check; main shut-off valve, emergency release type; filler cap,

dome type manhole cover equipped with three-way valve and fire screen; tank sump, cap. 7 gal. with drain valve; ground wire, 25 ft. static wire bolted to chassis; ground chain, bolted to chassis; and strainers, 60 mesh in suction line between tank and pump, 90 mesh built in air-release, and 100 mesh in nozzle.

Offers New Passenger Ramp

Economy Aeroramp, made by **Airquipment Co.,** Burbank, Cal., is designed for passenger loading requirements (except nose loading) of multi-engine planes where door sill is within 51-120 in. height range. Unit incorporates a new type hydraulic mechanism, fairings, laced canvas side panels, and self leveling steps. Swinging platform for door-free action or unusual loading operations. Stairs and platform are covered with non-skid, oil- and weather-resistant rubber treads. Ramp has molded rubber tired wheels and twin cam action. Lever operated locks prevent position slippage.

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YOU know the situation today. Dealers moaning about a sales slump. Customers staying away. Banks asking for money. Owners putting planes up for sale, adding to the used-plane lists. It's a tough market today, as you know all too well. Days of taking orders are over and now it's time to sell.

But don't overlook this: ***the float plane market is wide open.*** There are over 30,000 planes in use right now that could be converted to floats. Conversions will bring you in hard cash, also keep those planes in use instead of forcing them on the market to compete with your new models.

As for new planes, floats form a market barely touched. Your missing customers are down at the beach, or alongside a river or lake. They want just what the floatplane can give them—water sports and quick access to vacation spots.

It may strike you as foolish, in these days of sales resistance, to ask a tough prospect to spend a bit more and get a floatplane. But remember, you're selling a means to the end all pilots want—a plane with real sport and utility. It's a plane that will stay sold with its owner.

Floats form that "added attraction," that extra advantage to make a lot more plane sales possible. They don't compete with landplanes. Sell a floatplane and you've done two things: sold a landplane and earned an extra bonus in the form of float commissions.

Take stock today. Look at your present market, then at the float market. Have you really tried to sell floats? Have you discovered how much water there is in your territory? Have you tried to sell floats for conversion? If you haven't, you're missing a good bet.

Edo backs you up, with national advertising, with sales literature and technical booklets, with advertising mats for local use. We'll be glad to send you samples.

So don't despair and jump in the river. Use that water to produce sales and profits. Floats are available immediately in all models. Ask your aircraft distributor for details. Or write to Edo for the facts, plus news about float base developments in your territory. Cash in now on the biggest market in aviation.

Edo FLOATS FOR REAL FUN IN FLYING

EDO AIRCRAFT CORPORATION 665 Second Avenue, College Point, L. I., N. Y.

Please send me details of Edo dealerships. I handle, or am interested in _____(make of plane).

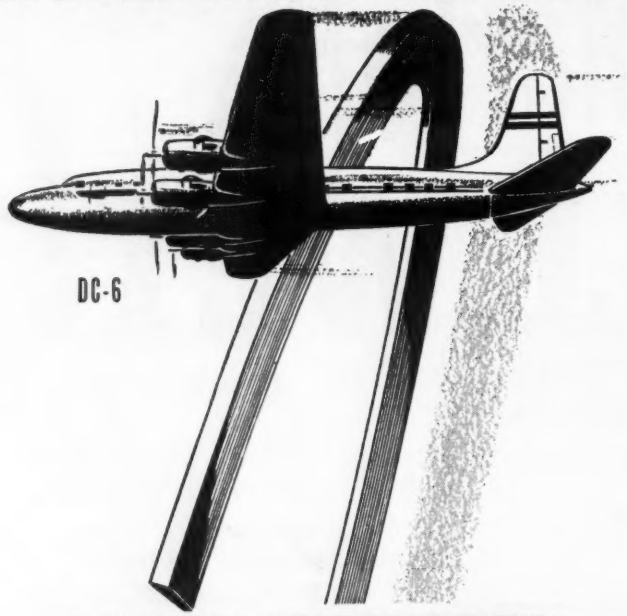
My aircraft distributor is _____

My Name _____

Address _____

City _____ State _____

Use U. S. SUPER-POSITIVE PISTON RINGS for



SUPER-POWERED *FLEXIBILITY*

The extreme range of power . . . to transport passengers in the mass or for the immediate responsiveness to the critically variable requirements of the helicopter . . . is characteristic of the superlative qualities built into U. S. *Super-Positive* Piston Rings.

Thus the ordinary Horsepower unit vastly multiplied and dependably assured for every aeronautical need, has been the extraordinary achievement of America's engine builders to the end that the airplane has undeniably become the supreme transportation instrument of the world.

for Positive Performance . . . Durability . . . Economy and Super-Powered Flexibility

Always Specify U. S. Super-Positive Piston Rings

U. S. HAMMERED PISTON RING CO., INC.

STIRLING, NEW JERSEY, U. S. A.

Here's Fluxing Efficiency For SOLDER SECURITY

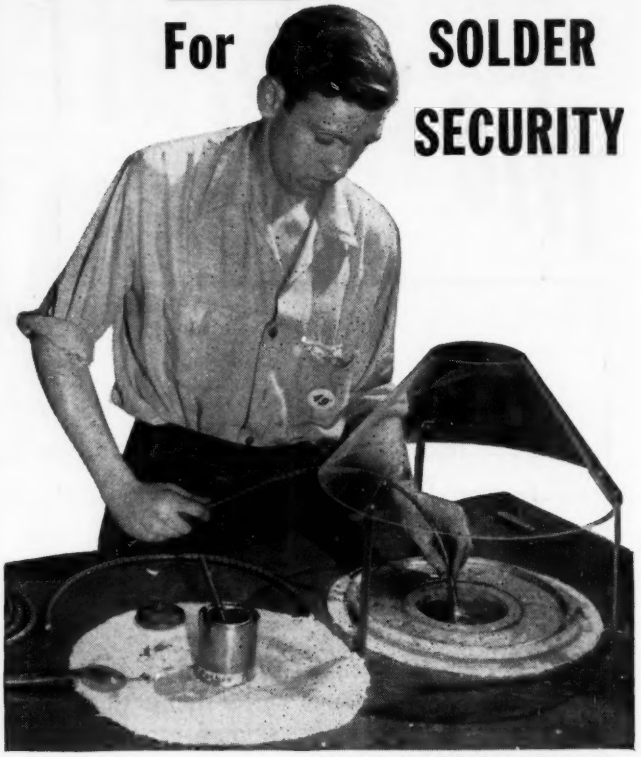


Photo courtesy Bell Aircraft Corporation

KESTER FLUXES

• Your soldering job can be only as effective as the flux you use. Don't take chances on solder failure because the flux isn't suited to the job. Be sure with Kester!

• Nearly half a century of practical experience is behind the development of Kester Fluxes. Drawing on that experience, Kester engineers have developed a vast range of flux formulas covering every possible soldering requirement.

• Various types of seams, spot soldering, electrical connections, sweating operations—all have their own special requirements, all their own *special fluxes.*

• In any form—salts, paste or liquid—you can count on Kester Fluxes to form solder bonds that hold tight and provide top product performance.

• To be sure of the right flux on every soldering operation, consult Kester engineers. They're soldering specialists, and there is no obligation.

KESTER SOLDER COMPANY
4206 Wrightwood Ave., Chicago 39, Illinois
Eastern Plant: Newark, N. J.
Canadian Plant: Brantford, Ont.

KESTER
Solder Fluxes
STANDARD FOR INDUSTRY

Information Tips

Uses of New Rigid Metal

Many applications of Rigidized metal, product of a special design-strengthening and texturizing process using both ferrous and non-ferrous sheet and strip, are described and pictured in new booklet issued by **Rigid-Tex Corp.**, 658 Ohio St., Buffalo 3, N. Y. Offered in variety of patterns, strong but exceptionally light material is stated to be particularly suitable for aircraft firewalls, instrument boards, seats, flooring, galley equipment, bulkheads, mufflers, and treads. Product is being used in new experimental Bell helicopter for flooring, servicing catwalk, and door kick plates.

Anti-Vibration Mountings for Engines

Information on anti-vibration engine mountings—the new Dynacone for lightplanes and the Dynafocal for executive type craft—is available from **Lord Mfg. Co.**, Erie, Pa. Former, termed easily applied rubber-in-shear product giving high degree of isolation of propeller and engine disturbing frequencies, is offered for 4- and 6-cyl. Continental, Franklin, Jacobs, and Lycoming plants. Latter is 3-point link-type suspension which is modification of 9-point type used on commercial planes. It is being designed into executive craft employing Jacobs L4MB and Continental R-670 engines. Also available from company is new Bulletin No. 106 providing photo and sketch illustrations of firm's various Multiplane bonded-rubber mountings.

"Flexonic" Products

Full line of products made by **Chicago Metal Hose Corp.**, Maywood, Ill., is covered in company's new Catalog G-47. Particularly stressed is firm's employment of "Flexonics" (defined as "science of controlled bending of thin metals for use under varying conditions of temperature, pressure, vibration, and corrosion") in achieving advances in design and manufacture of various flexible metal conduit units and other aircraft parts.

Sky-Broadcasting Equipment

"Sound Broadcasting From Airplanes" is title of mimeograph paper available from **University Loudspeakers, Inc.**, 225 Varick St., N. Y. C. Described is loudspeaker equipment offered by company for sky-broadcasting commercial advertising. Installation of a unit in a Piper Cub is detailed, and method of making announcements it outlined.

Three New Multi-Channel Transmitters

Comprehensive color booklet from **Federal Telephone & Radio Corp.**, 100 Kingsland Rd., Clifton, N. J., describes three new multi-channel communications transmitters for ground-to-air and point-to-point service. Included is transmitter buying chart indicating how basic equipment can be expanded to meet future requirements.

Booklets on Magnets and Plastics

"Permanent Magnets" is title of 35-page illustrated booklet from Metallurgy Div., Chemical Dept., **General Electric Co.**, Pittsfield, Mass. Description of use of more than 300 permanent magnets in each B-29 prefaces details of design, characteristics, and materials. In addition, a new 64-page booklet, "Textolite Laminated Plastics," has been released by company's Plastics Div. at Pittsfield. Engineering, properties, and applications of these laminates are treated, and a list of 44 grades of sheet material is included. There are various aviation applications.

Welding Electrodes and Alloys

Enlarged edition of a bulletin covering Ampcoloy resistance welding electrodes and alloys is being distributed by **Ampco Metal, Inc.**, Milwaukee 4, Wis. Known as Bulletin 68B, it is profusely illustrated with diagrams of tips and holders. Also presented are tables of alloy properties, applications, stock sizes, recommended electrode material, etc.

Four-Purpose Impact Tool

New 4U universal electric impact tool, stated to do work of four special-purpose tools, is publicized by **Ingersoll-Rand**, 11 Broadway, New York City 4, in photo-illustrated color folder. Using standard at-

The Approved All-Purpose Distress Signal

A-P DAYNITE DISTRESS SIGNAL

T. M. Reg. • Patents Applied For

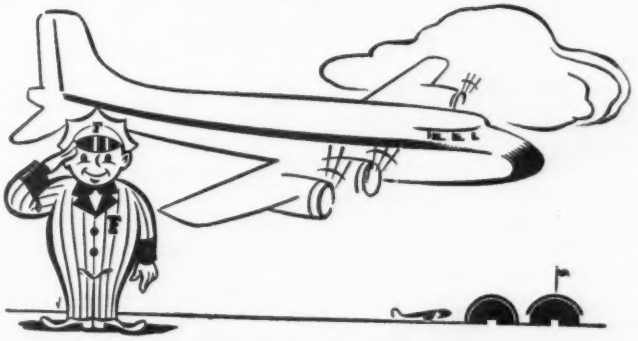
1,500,000 NOW BEING MADE FOR ARMED FORCES

★ **STANDARD** — U. S. Navy and U. S. Naval Air Force.
★ **STANDARD** — U. S. Marine Corps.
★ **APPROVED** by the U. S. Coast Guard for ships lifeboats and life rafts.
★ **APPROVED** by the Civil Aeronautics Administration as replacement for Very pistol and cartridges.
★ **SPECIFIED** by Air Transport Association for all inflatable life rafts
★ **OBSERVED** from aircraft in Official U. S. Coast Guard test — 33 miles.
★ **OBSOLETES** pistol-projected, floating and roman-candle type signals.

Hand held. Safe. Dependable. *Each signal absolutely watertight. Light—less than 7 oz. Compact—5½ long.* 20-second brilliant night flare *plus* 20-second bright orange day smoke in opposite ends of steel container. Can be seen day or night when overcast would obscure pistol or roman-candle type signals. *Available at all marine and aviation supply dealers. Accept no substitutes.*

AERIAL PRODUCTS, INC. MERRICK, L. I., N. Y.

A Smooth Take-Off . . . . .
A Happy Landing . . . . .



Seal your "air power" with Fitzgerald gaskets—a famous and dependable name in gaskets the world over.

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Branches at Chicago and Los Angeles
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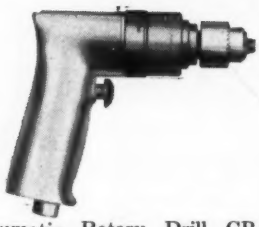
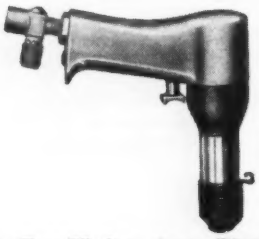
Fitzgerald
GASKETS
GASKET CRAFTSMEN SINCE 1906

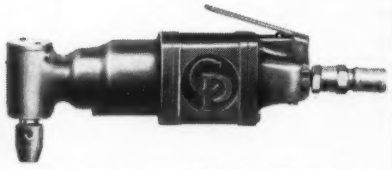
CP PNEUMATIC AND ELECTRIC TOOLS...



Pneumatic Rotary Drill CP-301 Model E for fast drilling in light metals

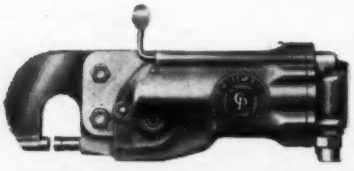


CP Slow-Hitting Aero Riveting Hammers deliver just the right riveting blow



CP Pneumatic Impact Wrenches speed application of nuts and screws

CP-806 Universal Electric Drills . . . fast drilling up to ¼"



CP-214 Compression Riveter for fast, accurate work in close quarters

CP-450 EA Pneumatic Riveting-Dimpling Machine — Assures precision coin dimpling of magnesium and the harder aluminum alloys. Deflection plate and adjustable coining ram pressure device (exclusive with Chicago Pneumatic) assure positive control of pressures between dimpling dies, irrespective of any line pressure variations.

This improved, electrically controlled machine eliminates cracked dimples . . . controls flushness to plus or minus .001" . . . and assures accurate nesting of dimples.

For Every Aviation Job—

There's exactly the tool you need for any production job in Chicago Pneumatic Tool Company's unequaled line of Pneumatic, Universal Electric and Hicycle Electric tools . . . Riveters, Riveting-Dimpling Machines, Drills, Impact Wrenches, Screw Drivers, Nut Runners, Grinders and Sanders, Tappers, Planishing Irons, Safety Balancers. Write for further information.

CHICAGO PNEUMATIC TOOL COMPANY

General Offices: 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

tachments, tool will apply and remove nuts, drill, ream, tap, drive and remove screws and studs, extract broken cap screws and studs, run wire brushes, do hole saw work, and drive wood augers. Its free speed is 2,000 rpm., and it will deliver 1,900 rotary impacts per min. under load. Weight of tool is 6½ lb.

Plier and Wrench Catalog

Described and illustrated in new company Bulletin 4728 are all pliers, adjustable wrenches, and pipe wrenches now marketed by **Plomb Tool Co.**, 2209B Santa Fe Ave., Los Angeles 54, Cal. Included are 24 pliers, 12 adjustable wrenches, and 6 pipe wrenches.

Cold Cleaner for Engine Parts

Decarbonizing, degreasing and bright-cleaning of blocks, pistons, crankcase assemblies, carburetors, and other parts with company's Samson cold cleaner is discussed and illustrated in new folder released by **Cee-Bee Chemical Co.**, 655 E. Gage Ave., Los Angeles 1, Cal. Also described is open tank immersion as well as cleaning in Samson Junior and Midget parts-cleaning units.

Jet Engine Presentation

Attractive 15-page color booklet, B-3834, "Westinghouse Jet Propulsion," is being mailed by **Westinghouse Electric Corp.**, P.O. Box 868, Pittsburgh 30, Pa. Yankee line of axial-flow jet engines is presented, with descriptions of 19XB Yankee, turbojet powering Navy's FD-1; 9.5-A Yankee, turbojet midget of 9.5 in. dia.; and new company turboprop, turbine drive airscrew engine in intermediate altitude and speed range. Graphic tables chart relative performance characteristics of basic types of thermal jet power plants, and thrust, thermal efficiency, propulsive efficiency, fuel weights, and probable range of flight speeds are considered.

Electrical Handbook

Comprehensive collection of electrical service bulletins are contained in 11th edition of "Operation and Maintenance Handbook" offered by **Delco-Remy Div., General Motors Corp.**, Anderson, Ind. Included are test specifications on all active company models of distributors, generators, cranking motors, and regulators. Three-color book contains over 200 pages. It is being distributed at list price of $1.50 through company's field service organization, United Motors Service, 3044 W. Grand Blvd., Detroit 2.

Electrical Distribution Limiters

"Positive Protection for Aircraft Electrical Distribution" is subject of new Bulletin 47F1 being distributed by **Burndy Engineering Co.**, New York City 54. Covered are limiters for 120-208v., 400 cycle a.c. circuits, also for 30v. d.c. circuits; mountings for a.c. and d.c. limiters; and aircraft Hylugs for a.c. and d.c. limiters.

Aviation Products Booklet

Aviation products and broad research facilities are treated in new 16-page color booklet B-3775 from **Westinghouse Electric Corp.**, 306 Fourth Ave., Box 1017, Pittsburgh 30, Pa. Covering eleven company plants, products outlined include airborne electrical equipment, Micarta pulleys and structural parts, lamps and lighting equipment, turbojet engines, engine test units, power supply and maintenance items, and communications units and accessories.

Oxygen System Sealer

Use of company's Oxyseal compound for improved pipe thread sealing in aircraft oxygen systems is subject of color leaflet No. A45 issued by **Parker Appliance Co.**, Cleveland 12, Ohio. Reported as nonflammable and non-seizing, compound is stated to meet —70 deg. to 302 deg. F. temperature tests and to be applicable on brass, steel, or aluminum alloy. Firm's lubricant products are also described.

New Weatherproofing for Windshields

Method of permanently weatherproofing windshields and windows is described in 20-page Catalog 100 issued by **Inland Mfg. Div., General Motors Corp.**, Dayton, Ohio. Special self-sealing weather stripping is stated to give lasting seal, to simplify body construction, and to reduce assembly labor costs. Glass and body panel fit channels in strip, then filler stripping is inserted to complete job.

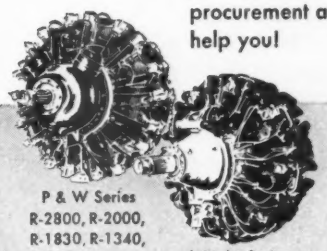
You're in Good Company...

when you

PUT THIS EMBLEM IN YOUR PARTS BINS!

You'll find it in the hangars of the world's finest air lines . . . in the best maintenance shops . . . *everywhere* that operators of transport type aircraft demand the best parts for maintenance of Wright and Pratt & Whitney aircraft engines. It's the *Aviation Activities, Inc.* emblem—the symbol of parts that are *new* and in *perfect* condition—of parts subjected to meticulous examination by *CAA licensed inspectors*—of parts treated, packaged and properly marked for long-time storage. It's the symbol of unmatched service, too—for Aviation Activities can give you *immediate shipment* of most of your requirements . . . *at substantial savings!*

Men of long experience in commercial and military aviation make up the personnel of Aviation Activities—men who know world-wide air line regulations and standards. They are familiar with your problems of line maintenance, overhaul, procurement and operation. Let their "know-how" help you!



P & W Series R-2800, R-2000, R-1830, R-1340, R-985

Wright Series R-3350, GR-1820

Write or wire today for "Stock List of Parts," listing available parts. Specify whether for Wright engines, P & W engines, or both.

AVIATION ACTIVITIES, Inc.

Serving the Air Lines of the World

AUTHORIZED AGENT FOR WAR ASSETS ADMINISTRATION

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Dallas, Texas, U.S.A.
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Another GREER First

HI-LO TENSION IGNITION SYSTEM TEST MACHINE

GREER MODEL MG-1

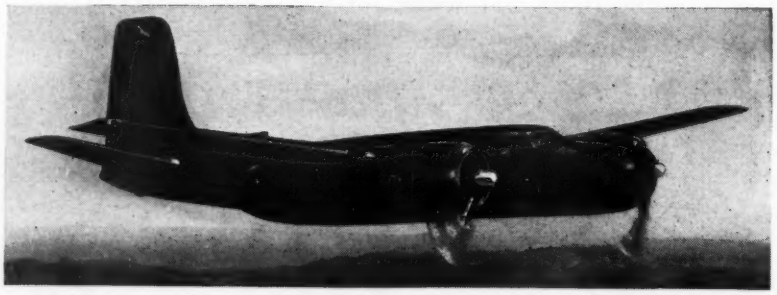
The best engineering skill of Bendix-Scintilla and Greer Hydraulics went into the making of this machine. Designed to rapidly and accurately test the latest types of high and low tension ignition systems, this unit will indicate at a glance whether or not the various components are operating properly to deliver the rich, hot sparks at the precise instant needed for best performance and maximum economy of the aircraft engine.

Simple pushbutton operation and infinitely variable speed fluid drive are but two of the important features of this unit. Get the complete story — write today for descriptive literature.

GREER HYDRAULICS, Inc.
454 EIGHTEENTH ST., BROOKLYN 15, NEW YORK
WEST COAST OFFICE
359 S. ROBERTSON BLVD., BEVERLY HILLS, CAL.

IMMEDIATE DELIVERY *Latest Model*

NEW DOUGLAS A-26B *Serial Number 28033*



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AROUND-THE-WORLD RECORD BREAKING Reynolds' "Bombshell"

Airplanes of this type now used by several nationally known companies and have been modified for executive or other use by one or more outstanding aircraft concerns to accommodate 5 passengers, pilot and co-pilot; includes full-length divan, very liberal luggage space, and lavatory.

Total time on airframe, engines, and propellers, 5½ hrs., which includes only test and delivery flights. Cruising speed at 7000 feet in excess of 300 miles per hr. Tricycle landing gear with steerable nose wheel. P&W engines 2800-79, water injection, carefully pickled and regularly inspected. Hamilton Standard Full-Feathering 3 blade propellers. Excellent single engine performance since N. L. licensing modification reduces present weight by more than 6000 lbs.

Price on inquiry. Address: **R. PATTINSON**
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NEW AIRPORT CONSTRUCTION

PROPOSED WORK

Richmond, Ind. — AIRPORT IMPRVS. — Bd. Aviation Commrs., W. Davis, chn., City Hall; municipal airport imprvs., administration bldg., hangars, paving. $152,000. S. W. Hodgin, City Hall, engr.

Fort Worth, Tex.—AIRPORT BLDG.—Purch. & Contg. Dept., 8th Army Air Force, Fort Worth, Officers' Club Addn. T-3-102, Fort Worth Army Airfield. **$205,000.**

Fairbanks, Alaska—AIRPORT—Town, municipal airport, incl. 200x5,500 ft. asphaltic concrete runway, turn-arounds, and taxiways, lighting, parking and sodded area, and terminal bldg. $1,198,200.

Yellowknife, Northwest Territories—AIRPORT IMPRVS.—Dominion Govt., Ottawa, Ont.; road construction at airport, $1,180,000; airport paving, $350,000. Dept. Mines & Resources, Ottawa, Ont., engr.

Rimouski, Que.—AIRPORT BLDG.—Rimouski Airlines, Ltd., Rimouski; aviation school, $100,000.

LOW BIDDERS

Champaign, Ill.—AIRPORT IMPRVS.—State Dept. Aeronautics, 503 S. 7 St., Springfield; airport imprvs., from General Paving Co., 30 E. John St., $89,308.

Peoria, Ill. — AIRPORT GRADING — State Dept. Aeronautics, 503 S. 7 St., Springfield; airport grading, imprvs., etc., Peoria Municipal Airport, for Peoria Pleasure Driveway & Park Dist., Glen Oak Park, Peoria, from Clark Bros. Co., 724 Kansas Ave., $106,788.

Springfield, Ill.—AIRPORT IMPRVS.—Springfield Airport Auth., 207 S. 6th St.; airport imprvs., from Wright Constr. Co., Farmington, Mich., $164,387.

Grand Marais, Mich.—AIRPORT—State Dept. Aeronautics, Capitol City Airport, Lansing, airport and runway construction, from P. C. Miller, Comstock Park. $210,310.

Houghton, Mich. — AIRPORT IMPRVS. — State Dpt. Aeronautics, Capitol City Airport, Lansing, airport imprvs., incl. $4,500 runway, from Thornton Constr. Co., Hancock. $575,408. G. R. Richardson, ch. engr. State Aeronautics Comn., Capitol City Airport, Lansing, engr.

Midland, Mich. — AIRPORT IMPRVS. — State Dpt. Aeronautics, Capitol City Airport, Lansing, June 4, runway, from Fisher Sand & Gravel Co., Midland. $92,533. G. R. Richardson, ch. engr. State Aeronautics Comn., Capitol City Airport, Lansing, engr.

Seattle, Wash.—AIRPORT IMPRVS.—Port of Seattle, Bell St. Terminal, Zone 1, June 18. 300,000 gal. rein.-con. reservoir with concrete roof at Seattle Tacoma Airport, from C. Anderson, Dexter Horton Bldg., Seattle, Zone 4. $41,620.

Oklahoma City, Okla.—AIRFIELD BLDG. REPAIRS—U. S. Eng., P.O. Box 61, Tulsa, Zone 2; repairs, alterations, enlargement airplane repair bldg. at Tinker Field, Serial 34-066-47-67, from D & D Constr. Co., Colcord Bldg. $277,818.

Rapid City, S. D.—HANGAR—U. S. Eng., 1709 Jackson St., Omaha, Neb.; hangar at Army Airfield, from Steenberg Constr. Co., W. 1757 1st Natl. Bank Bldg., St. Paul, Minn., $1,402,968. Est. $1,370,000.

CONTRACTS AWARDED

Pittsburgh, Pa.—AIRPORT WATER SUPPLY—Allegheny Co., County Office Bldg.; water supply sys. at Greater Pittsburgh Airport, Moon Twp.; Contr. A, standpipe, to Pittsburgh Des Moines Steel Co., Neville Island, $48,450; Contr. B, standpipe electrical work, to Devlin Electric Co., Bessemer Bldg., $1,194; Contr. C, 11,000 ft. 10 in. waterline, to Bouquet Constr. Co., 4662 Old Boston Rd., Pittsburgh, $56,031. Grand total $105,675. Est. $120,000.

Quonset Point, R. I.—AIR STATION EQUIPMENT—Pub. Wks., Naval Air Station, Quonset Point, 5 elevated tanks, water sys., repairs, incl. painting tanks and towers; Spec. 18,333, to National Contg. Co., Shaw St., Tiverton, $26,910.

Spokane, Wash.—AIRPORT IMPRVS.—U. S. Eng., Textile Tower, 7 and Olive Sts., Seattle, Zone 1; 500,000-gal. rein.-con. covered reservoir, 21x26 ft.; rein.-con. pumphouse at Army Air Base, to McInnis & Roberts & Henry, George and Son, Hutton Bldg., $54,613.

St. James, Man.—AIRPORT—Dept. Transport, Ottawa, Ont.; Stevenson Airport addn., to Commonwealth Constr. Co., Ltd., Royal Bank Bldg., Winnipeg. Approx. $990,000.

SAVE WITH SURPLUS

The War Assets Administration, through its network of conveniently-located Approved Distributors, is disposing of extremely valuable Aircraft Components at bargain prices. Thousands upon thousands of general replacement parts, hardware items, tires and tubes, instruments, engine parts, etc. are being offered. Take advantage of this great opportunity to fill your needs. Purchasing of this equipment has been simplified to a high degree. Approved Distributors have been appointed by the War Assets Administration on a basis of their technical experience and their ability to serve you intelligently—and quickly. Write to the Office of Aircraft and Electronics Disposal, WAR ASSETS ADMINISTRATION, 425 Second Street, N. W., Washington 25, D. C. for a complete list of Approved Distributors.

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WAR ASSETS ADMINISTRATION

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Offices located at: Atlanta • Birmingham • Boston • Charlotte • Chicago • Cincinnati • Cleveland Denver • Detroit • Grand Prairie, Tex. • Helena • Houston • Jacksonville • Kansas City, Mo. • Little Rock Los Angeles • Louisville • Minneapolis • Nashville • New Orleans • New York • Omaha • Philadelphia Portland, Ore. • Richmond • St. Louis • Salt Lake City • San Antonio • San Francisco • Seattle • Spokane • Tulsa

1222

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EMPLOYMENT • BUSINESS • OPPORTUNITIES • PLANES • EQUIPMENT—USED or RESALE

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60¢ a line, minimum 4 lines. To figure advance payment count 6 average words as a line.

POSITIONS WANTED (full or part-time individual salaried employment only), ½ above rates.

PROPOSALS 75¢ a line an insertion.

INFORMATION

BOX NUMBERS in care of any of our New York, Chicago or San Francisco offices count 10 words additional in undisplayed ads.

DISCOUNT of 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPAYED RATE:

The advertising rate is $9.00 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page.

NEW ADVERTISEMENTS received Thursday will appear in the issue dated second Monday following subject to limitation of space available

SELLING OPPORTUNITY OFFERED

SALES AGENCY—An opportunity to build a business of your own under the direction of a national aviation sales organization. Unusually high earnings possible (Upwards of $1000 per month). You must have sales ability, be willing to work hard and sincerely believe in the future of aviation. Sale of planes or equipment not involved. Five to ten thousand dollars required depending on the territory. A knowledge of aviation is helpful but you must not now be a flight operator. Only one appointment open from each non-competitive market area. Give full particulars of your background and how you can be reached by telephone to arrange a preliminary interview. RW-1154, Aviation Week, 68 Post Street, San Francisco 4, Cal.

POSITIONS WANTED

AIRLINE TRANSPORT Pilot 14 years' experience, 7,400 hours total; 5,000 hours as Captain on two- and four-engine aircraft. No accidents. Can furnish best of references. Desire position as company pilot or Feederline pilot. 35 years old. PW-1151, Aviation Week, 630 N. Michigan Ave., Chicago 11, Ill.

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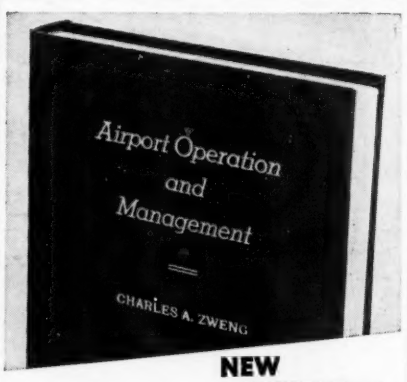

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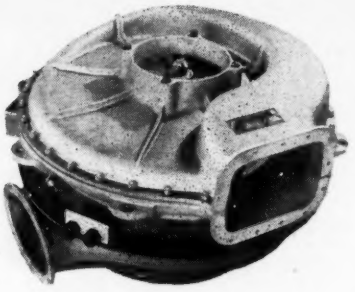

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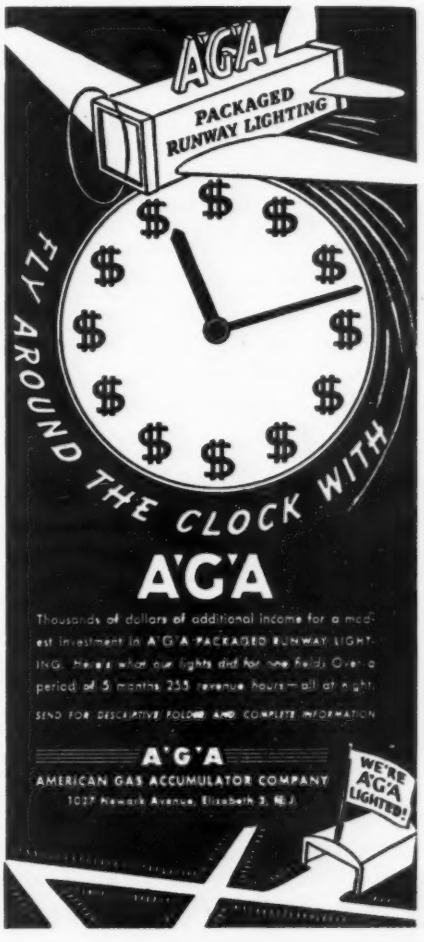
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EDITORIAL

Aviation Week Takes Its Stand

Aviation Week, in its first issue, presents its editorial viewpoint on top aviation issues. In the tradition of its two outspoken predecessors, Aviation and Aviation News, this new magazine, on this page, will leave no opportunity for doubt on its editorial position.

Yet the technical and news pages will be maintained rigidly impartial. Every editor and correspondent is under instructions to base every report on the significance of his facts to commercial aviation, and on service to industry.

Challenging comment from readers is not only invited. It is essential if any publication is to remain vigorous, informative, and attain indispensability to its industry. Every letter received from readers who indicate their opinion of this first issue of Aviation Week will be acknowledged. A letters column will be introduced in the near future, where readers may argue with the writters on Aviation Week, or with the editor for the opinions expressed here.

The following stands on current issues may start the arguments:

Competition: A strong conviction for the private enterprise system is responsible for an abhorrence of unnecessary monopoly. The chosen instrument or community company proposal demands unnecessary monopoly. Aviation Week is unequivocally against it.

Attitude Toward Government and Industry: Although an aviation business paper, Aviation Week does not condone extravagance and inefficiency in any state or federal government aviation agency. It is common practice of the defenders of waste to cry treason when an aviation magazine attacks an aviation agency editorially on such charges. Let them cry. The facts will speak for themselves.

Inefficiency and short-sightedness are as unworthy of business and industry as of government. But they seldom flourish so easily in business. Competition sees to that.

The trend to government paternalism has increased this public subservience to many of government's dicta. The press has no greater opportunity for public service than its ability to shed lights on the policies of government and the motives inspiring them.

Military Aviation: Readers of Aviation and Aviation News have read for months of the deterioration of our air forces, and the deep concern felt by our military and naval leaders, Fortunately, the newspapers in recent weeks have awakened to this problem. Aviation Week is convinced that continuation of an air force in being—the largest in the world—back by an efficient and expandable aircraft manufacturing industry, are the keys to peace. It is obvious that no other country must be allowed to surpass us in research.

Yet, we do not want the sky darkened by aircraft, nor the public's money squandered on unnecessary and second rate procurement, nor on WPA-type research centers. Those who direct our Army and Navy expenditures owe as great an obligation to the taxpayer to disburse his funds wisely as they do to protect him from foreign aggression. Aviation Week will never fail to strike out editorially against mismanagement, stupidity, and pettifoggery, in the military services as in any other field.

Private Flying: We know of no other aviation publications which have reported so consistently and so constructively through the years the activities of the nation's fixed base operators. Editorial support has been forthcoming time after time because of our faith in this phase of aviation.

Despite the recent downward trend in personal aircraft production, sales and service, the future of personal flying over the long-pull must be a growth-curve. The skeptics we see and hear today are those who consider our problems insuperable. They ignore the drive for perfection, the technical potential of this country, and the possibility of far-reaching discoveries.

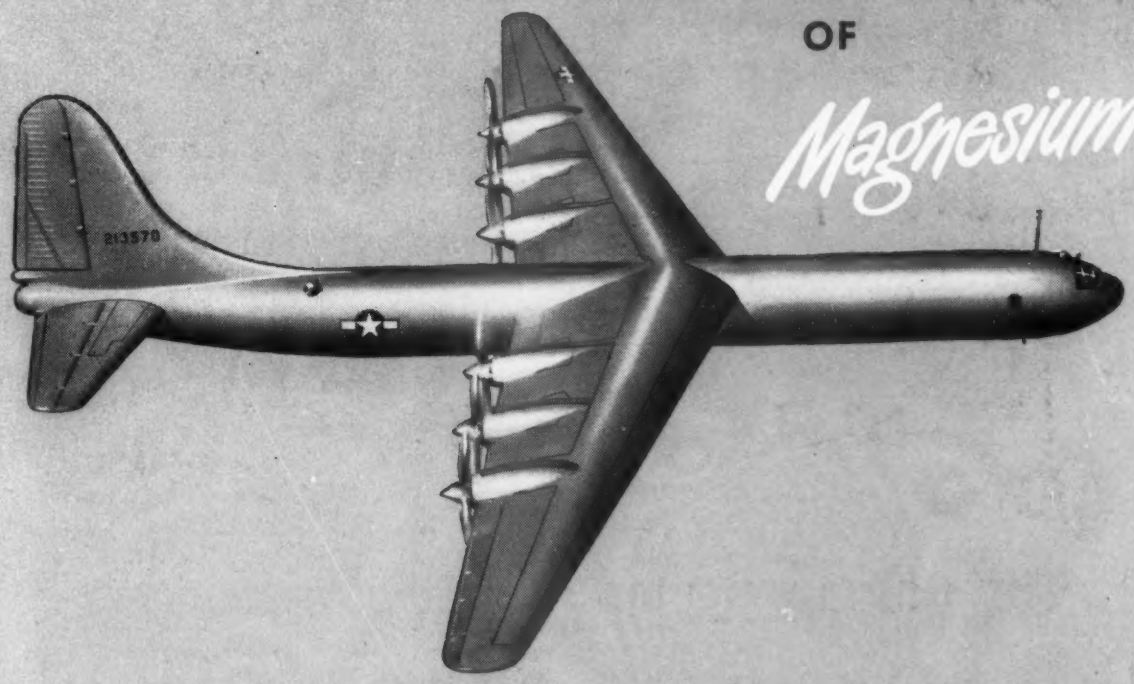
These discoveries are inevitable, and those who turn thumbs down on personal aviation will be proved as wrong as those short-sighted skeptics in Billy Mitchell's day who said the airplane would never amount to anything in war.

Air Transport: McGraw-Hill's deep interest in air transport is evidenced by its publication of a monthly magazine by that name. The nation's airlines are the finest the world has even seen. Aviation Week, like the magazine Air Transport, will comment editorially on developments in this dynamic industry.

But the possibility of drastic and unfair restrictions which may be clamped down by the President's accident investigating board represents the darkest cloud on the horizon. This editorial page will consider the President's board a matter of top priority. U. S. airlines already are far superior to the carriers of all other countries, in safety as in other categories. Many airline-wise persons already refuse to fly on foreign-operated transports because of questionable maintenance and operations procedures and general technical inferiority. The Board must not be the instrument for setting back our own lines, yet permitting foreigners to come into this country under inferior standards.

ROBERT H. WOOD

in the Great B-36 FIVE TONS OF *Magnesium!*



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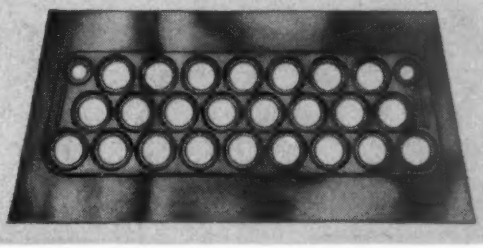

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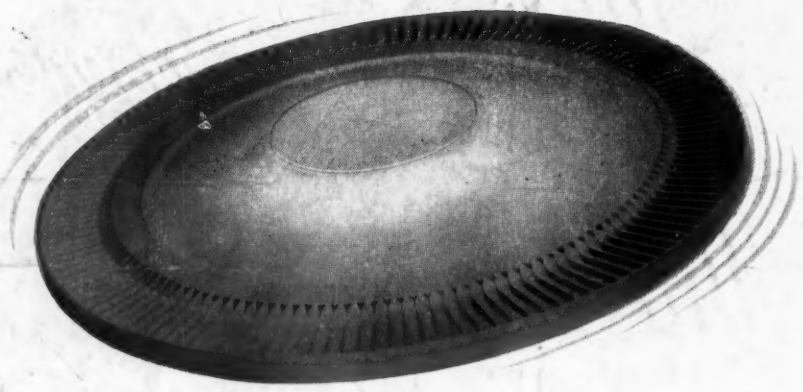

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AVIATION WEEK

JULY 14, 1947

INCORPORATING AVIATION AND AVIATION NEWS

A McGRAW-HILL PUBLICATION

TECHNOLOGY DEPARTMENT

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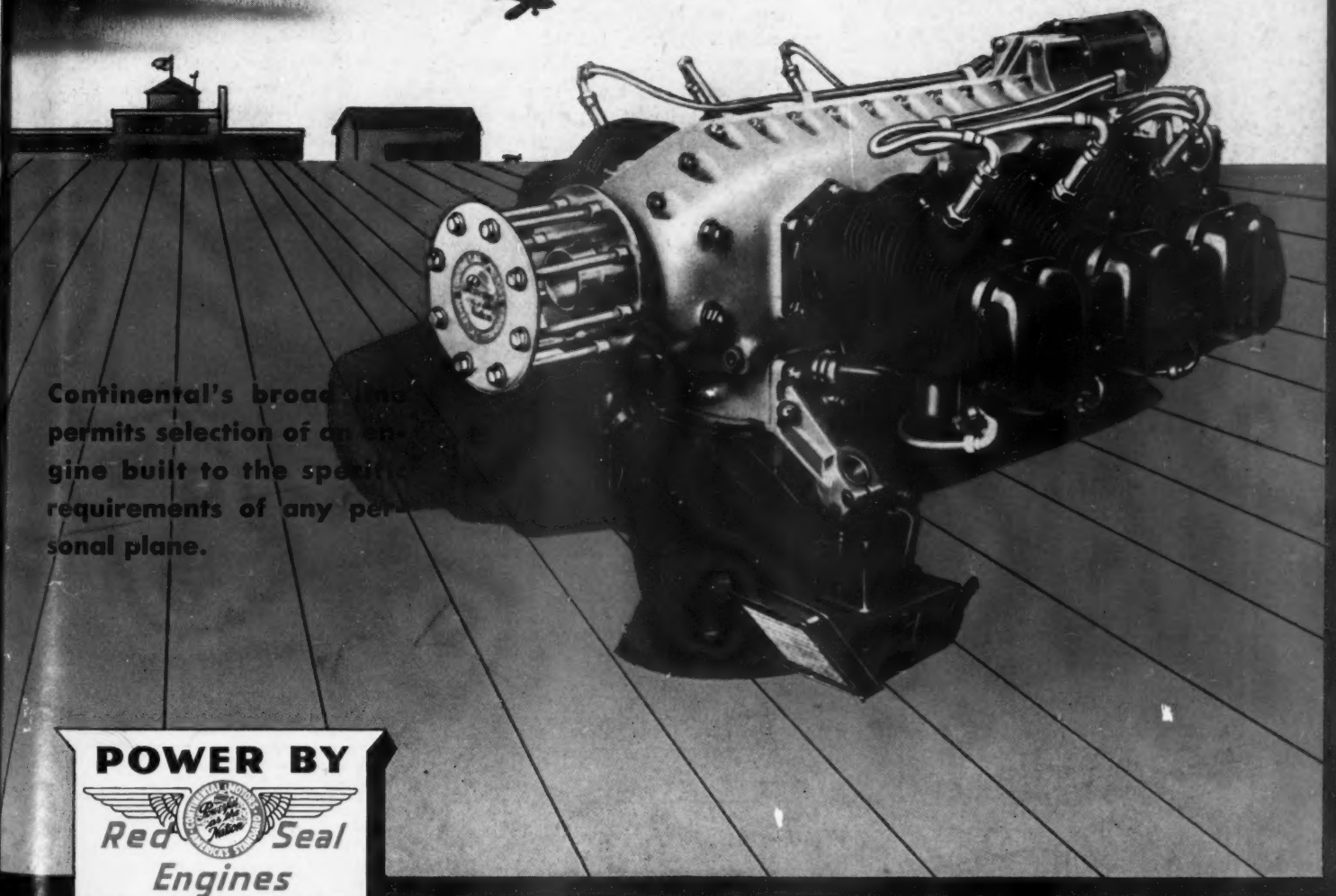
C-125

Six-cylinder smoothness with the favorable power-weight ratio of a "four".



Continental's broad line permits selection of an engine built to the specific requirements of any personal plane.

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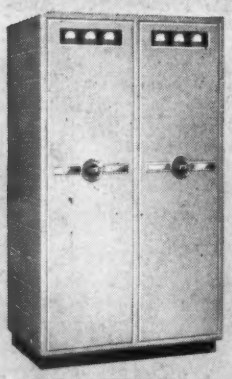
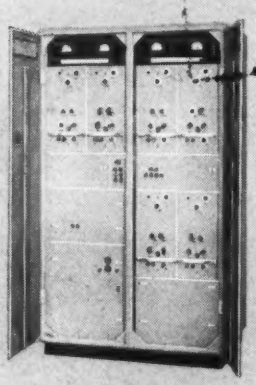
TWA — TRANS WORLD AIRLINE

UNITED AIR LINES

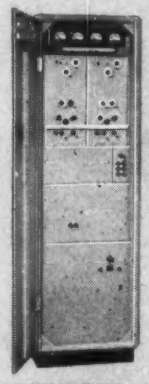
AMERICAN AIR LINES — AMERICAN OVERSEAS AIR LINES



RADIO TRANSMITTER 184-A. Provides maximum operation on 2 phone channels and 2 CW channels simultaneously, or 4 CW channels simultaneously, with choice of up to 4 different frequencies.



RADIO TRANSMITTER 185-A. Provides maximum operation on 1 phone channel and 1 CW channel simultaneously, or 2 CW channels simultaneously with choice of up to 6 different frequencies.



RADIO TRANSMITTER 186-A. Provides maximum operation on 1 phone channel and 1 CW channel simultaneously, or 2 CW channels simultaneously, with choice of 2 frequencies.

USE FEDERAL'S MULTI-CHANNEL TRANSMITTERS

Interchangeable-unit Construction gives a new high in versatility for ground-to-air and point-to-point communication

THE BIG AIRLINES, like TWA, United and American, know how important it is to meet the fast-changing needs of modern airport communication service, without obsolescence of costly equipment. And they've solved this problem with Federal's multi-channel ground station transmitters, 184A, 185A and 186A. For interchangeable RF units, power supplies and modulators make them adaptable to an almost unlimited combination of operating characteristics — for present needs and those of the future!

In *one* transmitter, you can now combine single or multi-channel CW and phone service in all three bands—HF, VHF, and LF. Unit-type construction simplifies maintenance and inspection, minimizes service interruptions and holds down operating costs. And, as always, Federal offers you the last word in modern engineering, top quality and precise workmanship — backed by 38 years of research and experience.

THIS NEW BOOKLET GIVES YOU ALL THE FACTS

A request on your company letterhead will bring your copy by return mail, without obligation. Write Dept. A505.

INTERCHANGEABLE COMPONENTS permit wide selection of ratings and characteristics

Transmitter	RF Units	Power Supplies	Audio Amplifiers
184-A	1 to 4	1 or 2	1 or 2
185-A	1 to 6	1	1
186-A	1 or 2	1	1
RF Units*			
101-A	HF, 2-20 Mc,—500 Watts, CW or Phone		
102-A	VHF, 108-140 Mc,—200 Watts, Phone		
103-A	LF, 200-540 Kc,—400 Watts, CW or Phone		
Power Supply 125-A	Provides power for simultaneous operation of 2 RF units on CW or 1 RF Unit on CW and 1 RF Unit on Phone		
Audio Amplifier 136-A	Provides voice modulation of any one RF unit at full rated output		

**Each RF unit is independent of all others—HF, VHF, and LF can be used in the same transmitter if desired.*

KEEPING FEDERAL YEARS AHEAD... is IT&T's world-wide research and engineering organization, of which the Federal Telecommunication Laboratories, Nutley, N. J., is a unit.

Federal Telephone and Radio Corporation

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Heated boots for climbing ice

ICE on an airplane's cowl rings is a real threat to tail surfaces and controls. The ice builds up until the heat of the engine finally cracks it. Then, instead of slipping harmlessly off, chunks of ice *climb* in the propeller wash and are hurled at high speeds toward the tail. Sometimes these ice chunks seriously damage the tail and expensive maintenance is necessary.

To solve this problem, B. F. Goodrich has developed cowl boots of electrically heated rubber. They keep the cowls clean of ice and eliminate the penalty of increased drag and the hazard of flying ice.

Made of thin, tough rubber, the boot has wires imbedded in its core which distribute the heat uniformly over its entire surface. Tests, like the one shown above, check the carefully planned heat distribution. The heated rubber boot is very flexible, fitting tightly and smoothly to the cowl. It also can be internally installed where design permits.

Used to protect propellers, spinner domes, air intakes and other protrusions, as well as hydraulic lines, water tanks and similar installations, B. F. Goodrich heated rubber is the most efficient way of getting the right amount of heat to a specific spot. It can be adapted to any power supply. Research to make heated rubber even better is a constant project of B. F. Goodrich engineers. *The B. F. Goodrich Company, Aeronautical Division, Akron, Ohio.*

B.F.Goodrich

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TRACING CLOTH
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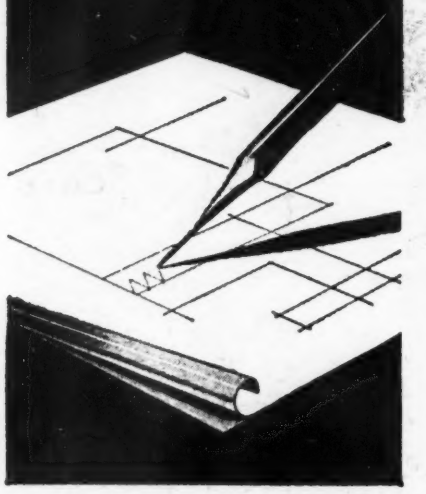

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AVIATION WEEK

Vol. 47 No. 2

INCORPORATING AVIATION AND AVIATION NEWS

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Drills and reamers formerly reground every 20 hours:

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every 80 hours!

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With Gulf M-L Cutting Oil, this line of multiple-spindle drill presses operates 300 per cent more hours between regrinds of drills and reamers—one of several improvements in machining efficiency obtained through the use of Gulf Cutting Oils reported by this prominent manufacturer of business machines.

THIS IS ONE OF HUNDREDS OF SHOPS that report improved machining practice through the use of the proper Gulf Cutting Oil for each job!

Gulf quality cutting oils can help your machines gain an edge in efficiency—mighty important for the period of keen competition just ahead! Here's the important reason: Every Gulf Cutting Oil has specific properties which insure better performance on certain types of jobs.

Call in a Gulf Lubrication Engineer today and let him show you how Gulf Cutting Oils can help you increase production and tool life and get better finishes. Write, wire, or phone your nearest Gulf office.

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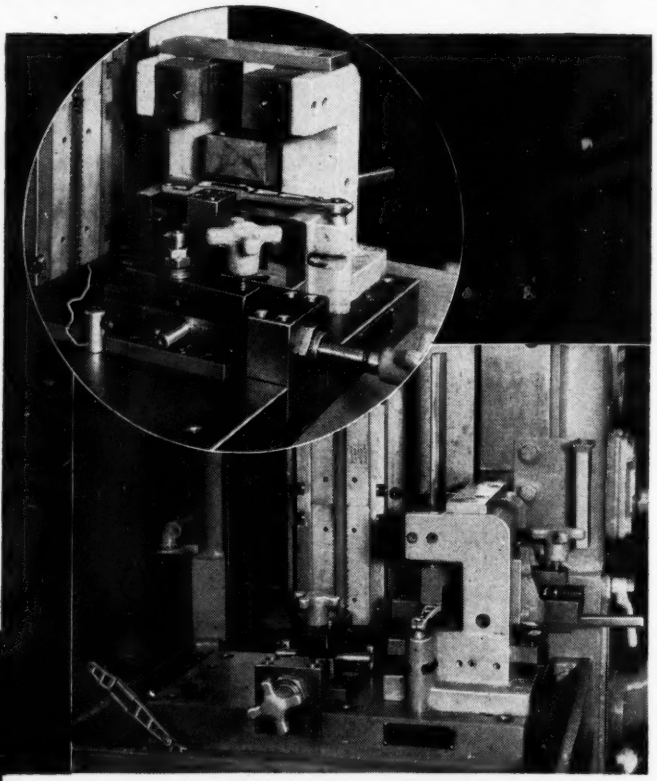
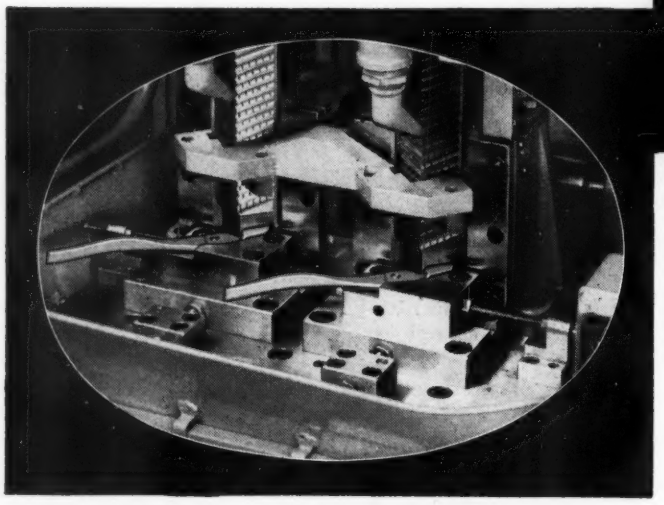
One of the most important elements of any broaching job is the work holding fixture. To successfully obtain top production the fixture must be easily operated, solid in construction, and hold the work rigidly in position during the broaching stroke. *American* fixture engineers are skilled in the design of automatic and semi-automatic fixtures for high production, and manually operated fixtures when economy is a foremost factor.

For better broaching *American* builds the following complete line of broaching machines: Single Ram, Duplex Ram, Universal Type 3-way, Vertical Internal Pull-up, Horizontal, and Rotary. All sizes and types of broaches are also available, as well as Pull and Push Heads from *American*, as your one source of broaching needs.



(Above)—A simplified manually operated two station fixture to produce two sewing machine parts to close limits. A cast iron Slide Block is straddle broached at the left hand station; a slot in a malleable iron Main Connection part is surface broached at the right hand station. Parts are clamped manually, and floating jacks, also manually-operated, are provided to prevent springing of the Main Connection part. Exceptionally fine finish is obtained on both parts which interlock in the final sewing machine mechanism.



(Above)—This *American* designed fixture for broaching the jaw teeth of plier halves consists of two work stations. Separate work locators are supplied for each type of plier half. Parts are automatically clamped and unclamped by means of an air cylinder. Location is taken from the previously drilled hole in the forged steel part. Production of plier halves is increased considerably over the previous machining method.

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THE AVIATION WEEK

CAUTIOUS OPTIMISM—From deep pessimism a few weeks ago the military aircraft manufacturers have swung to cautious optimism. Reason: The startling new attitude in the Senate toward Army and Navy appropriations requests. Although both bills were still being enacted last week at press time, industry was cheered because the Senate had added $78,000,000 in contract authorization for Navy planes, and $203,490,000 in authorization for the AAF. That meant AAF could buy 1,100 new aircraft—if both Houses agree.

HOW POTENT IS THE LEGION?—How much credit for the apparent switch in Congressional sentiment can go to the American Legion was an interesting question. Since last spring, Aircraft Industries Association has been cooperating with the Legion on a program of public enlightenment. Idea was that the Legion, one of the largest organized citizens' bodies, could carry the message of the hazards of a crippled air fleet to the grassroots in the hope it would filter up to Congress. That may have been a successful approach. At any rate, some aviation leaders who have always shied from any public campaign, believed they saw important possibilities in the device.

MORE BUCK ROGERS PLANES—Increased aircraft procurement funds plus unexpected rapid progress in NACA high-speed research spells new AAF combat types with low aspect ratio wings, swept wings and tails. If funds are restored, look for a fistful of new AAF transonic types—drawings are already complete—to fly this year. Combat designs may outstrip new research aircraft in performance before the elaborate flight research program has reached the half-way mark.

AIRLINES BREWING BARGAINS – Moves by Chicago & Southern in lowering fares 15% on midweek roundtrips and by Capital Airlines in combining with a steamship line to offer packaged air-water vacations on credit are just the beginning of promotional plans to fill seats. Watch for the airlines to make a deal with Hertz Drivurself System in agreements providing for convenient rental of cars by plane passengers.

FORWARDERS & CARRIERS FEUDIN'—Feud between airfreight forwarders and certificated airlines is moving into the open. Forwarders intend to ask CAB to throw out the airlines' new consolidated tariff, which is so constructed that indirect carriers cannot make a profit by combining small shipments into larger lots for a lower rate.

MONOPOLISTS ARE CAGEY—Attempts will be made to force proponents of chosen instrument legislation into a showdown on the issue. Now that it is apparent the proposition would be defeated soundly in both House and Senate Interstate & Foreign Commerce Committees, Chairman Brewster (Senate) and Chairman Wolverton (House) are scheming to avert a vote. If successful, they would leave the proposal in suspended animation for reactivation at any opportune time in the future. Rep. Priest, strong opponent of monopoly, will try for a showdown vote at a coming session of the House group. One attempt by Sen. Ed Johnson to inveigle a vote in his Senate Interstate aviation subcommittee failed: Brewster insisted there was no point in voting on the matter as long as it was plain that it would not be cleared for floor action. Johnson will try again. Standing record in Congress for the chosen instrument remains its 10-10 tie vote when it missed clearance by the Senate committee for floor action in 1945.

TWA RESHUFFLES—Widespread personnel changes announced by TWA are merely another installment in a long-term reorganization. John Collings, executive vice president, is running the show, reporting direct to President Cohu. More big moves are in the works.

LIGHTPLANE COMPANY STOCKS—Responsible lightplane people are worried by possibility of public losses in small, new, poorly-financed "manufacturers." Last week Dansaire Corp., Dansville, N. Y., and president George C. White, Jr., were permanently enjoined by New York Supreme Court from sale of company securities in the state, on petition of the state Attorney General. Firm had developed an experimental 3-place personal craft, the Dansaire Coupe, but had not produced it in quantity.

WASHINGTON OBSERVERS PREDICT:

► Some delay and Senate debate on appointment of Assistant Secretary of Commerce W. A. M. Burden's successor seems certain. Appointment carries with it direction of CAA, Coast & Geodetic Survey and Weather Bureau, and membership on Air Coordinating Committee and NACA. The appointee is expected to undergo grilling on his knowledge and technical qualifications in these fields.

► Both AAF and Navy will swing to UHF air communications facilities replacing VHF, on which CAA and airlines are standardizing.

► President's special air safety board will recess soon and resume in the fall. Long agenda still remains.

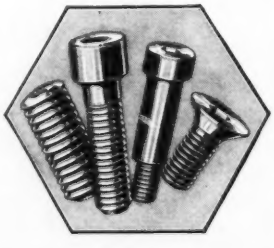
► As result of speedy pace set by Truman Board, a renewed drive is likely for an independent air safety board at next session of Congress. ALPA will spark it.

ALLEN HEX-SOCKET PIPE PLUGS

From crankcases to sea-wings, in oil lines and hydraulic fluid lines, these plugs have provided the perfect seal since the infant days of aircraft. They prevent leakage where safety *depends upon it.* The extra Allen HOLDING-POWER prevents loosening under vibration.

This plug has all the strong-points of Allen Hex-Socket Screws. Cold-drawn of special-analysis *ALLENOY* steel (standard); also available in duralumin, bronze, brass, stainless steel and other metals. Lead screw threaded to close tolerances; scientifically heat-treated for *balanced* hardness and toughness.

In the plants that make the planes, Allen strength and precision are incorporated in a multitude of machines and machine tools, by use of the hex-socket screws shown at right. The line is *complete* in extra-dependable fastenings for all manner of assemblies.



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Call your local Allen Distributor for samples, or order stock for prompt delivery from his warehouse.

THE ALLEN MANUFACTURING COMPANY
HARTFORD 1, . . CONNECTICUT, U. S. A.

NEWS DIGEST

DOMESTIC

Glenn L. Martin Co.'s Model 303, pressurized sister ship of the 202, made its first flight.

Consolidated Vultee's Model 240 has begun CAA certification tests and by last week was about one-third through.

National Science Foundation Bill, including a clause providing that the director be appointed by the foundation instead of by the president, was approved by House Interstate and Foreign Commerce Committee.

Firestone Aircraft Co. will license other aircraft and accessory manufacturers to make its aviation products, and will increase concentration on expansion of its aircraft and accessory distribution at airports.

Larry Cates, formerly of TWA and librarian of the House of Representatives, is new Washington Representative of Air Line Pilots Association, succeeding John Dickerman, resigned.

Northrop Aircraft, Inc., has received $10,000 contract from CAA for design of a cross-wind landing gear for its tri-motor Pioneer. This is seventh and last of CAA's castering gear development contracts. Goodyear has been granted a $51,800 contract for castering gear on a DC-3, and Bellanca a $5,650 job for gear on its four-place Crusair.

Al Cline was appointed public relations director of Northrop Aircraft to succeed Dale Armstrong, who resigned to direct TWA public relations. Cline has been assistant public relations director for Northrop for three years.

Ernest R. Breech resigned as a member of the board of directors of North American Aviation, Inc.

Stanley R. Shatto has been named Vice-President-Maintenance and Engineering of Western Air Lines to succeed William Maxfield who resigned. Shatto held the same position with Continental Air Lines.

United Air Lines reports revenue passenger miles increased 19 percent during first six months of 1947, over same period last year. Cargo gained 102 percent, while mail dropped 15 percent.

FOREIGN

Society of British Aircraft Constructors has re-elected W. R. Verdon Smith as president for the 1947-48 year. Vice-President is Sir Roy H. Dobson, managing director of A. V. Roe and Co.

Ceylon Council has sanctioned inauguration of state air service between Colombo and India.

British European Airways plans to start air taxi service with helicopters next spring.

Armstrong-Whitworth's AW-55, 28-passenger feederliner, has been renamed the Apollo. Original designation was Avon.

EVERY MAJOR AIRCRAFT ENGINE MANUFACTURER SPECIFIES

BENDIX-SCINTILLA

IGNITION EQUIPMENT

On all types of aircraft the Bendix-Scintilla* reputation for engineering excellence and manufacturing precision is reproven daily by a variety of ignition products.

The entire family of Bendix-Scintilla products—electrical connectors, aircraft coils, wiring harness, radio filters and other ignition equipment—delivers the same high degree of performance that has made Bendix-Scintilla Magnetos the standard of the industry.

Follow the example of leading engine manufacturers and airlines—specify Bendix-Scintilla ignition equipment!

*TRADE MARK

SCINTILLA MAGNETO DIVISION of
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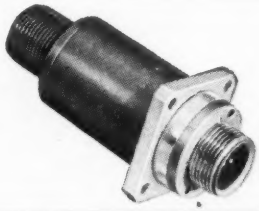
AVIATION CORPORATION

Bendix-Scintilla Radio Interference Filters are designed for insertion in aircraft ignition grounding circuits. Extremely successful in eliminating radio noise at very high frequencies.



Bendix-Scintilla builds both high tension and low tension aircraft ignition systems. The newly developed low tension systems are designed for extra efficiency, especially at high altitudes.

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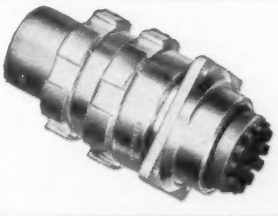
Bendix-Scintilla is also a leader in the field of Diesel Fuel Injection Equipment and is in wide use on railroad, marine and stationary Diesel engines.



Bendix-Scintilla Electrical Connectors are built in a wide variety of sizes and types. Precision-designed to give a pressure-tight, water-tight and radio-quiet assembly, they are performance-proved by thousands of installations.

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AIRCRAFT BATTERIES

USED IN MORE PLANES...COMMERCIAL, GOVERNMENT AND PERSONAL... THAN ANY OTHER MAKE OF BATTERY

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12 Volts
AIR TRANSPORT BATTERY
Used by leading airlines

Type 6TS9-F
12 Volts
PERSONAL PLANE BATTERY
For lights, radio and starting

Exide Aircraft Batteries embody the most advanced engineering developments. Their extra power and rugged construction assure safe, dependable performance and a long life with low maintenance costs. And you can count on Exide Aircraft Batteries for maximum performance per pound of weight.

There are Exide Aircraft Batteries for planes of every kind.

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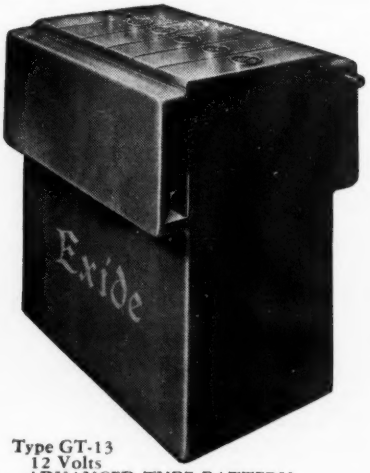
Philadelphia 32
Exide Batteries of Canada, Limited, Toronto

Type 3AC-7
6 Volts
LIGHT PERSONAL PLANE BATTERY
For ignition and small lighting loads

Type 12TS-9L
24 Volts
MILITARY TYPE BATTERY
For converted Government planes



Type GT-13
12 Volts
ADVANCED TYPE BATTERY
Used in jet-propelled planes

VOLUME 47 • NUMBER 2

AVIATION WEEK

JULY 14, 1947

INCORPORATING AVIATION AND AVIATION NEWS

Largest AAF Helicopter Flies; Points to Commercial Trend

Kellett XR-10, designed to carry 10 passengers or 2,000 lb. cargo load, successful on initial flight tests; has 350 mile range.

By ALEXANDER McSURELY

A sturdy, all-metal 12-place Army helicopter capable of hovering at 6,000 ft. altitude, climbing to 18,800 ft. or travelling forward at a top speed of 121 mph at sea level has passed its first flight tests successfully at Kellett Aviation Corp., North Wales, Pa.

The Kellett XR-10, as an ambulance, will carry six litter patients and is fitted with a hatch in the fuselage, 33 by 52 in., and a hoist, to load litter patients, personnel or cargo while hovering over an otherwise inaccessible spot.

▶ **Twin Engines**—Two Continental engines (Model R-875-45) of 525 hp each, turn the twin 65 ft. diameter intermeshing rotors of the XR-10, making it the most powerful helicopter now flying and one of the two largest rotary-wing aircraft.

McDonnell Aircraft's Navy helicopter XHJD-1, with two 450 hp Pratt & Whitney Wasp Jr. engines turning 46 ft. rotors, will carry an equivalent load of 10 passengers plus crew of two, while the only other helicopter near the same size known to be flying, the Piasecki XHRP-1, has one 600 hp Pratt & Whitney R-1340 engine which turns two 36 ft. diameter rotors.

Impact of the XR-10 will probably be greater in the field of commercial helicopter operations than as a military vehicle, although its 350 mile range at 90 mph cruising speed and its ton of payload make it worthy of serious consideration in both fields.

▶ **Early Solution**—Three large experimental helicopters, by as many companies, are flying, indicating likelihood of early technical solution of many problems. Of the three, the Kellett looks most like a conventional airplane, with its all-metal fuselage, external nacelles, and tricycle landing gear.

Appearance may be more important than designers think, in selling a new means of transportation. Analysts generally agree that the helicopter will begin to come into its own economically only when it is large enough to haul a number of paying passengers. The Kellett, from appearance and performance, is approaching that point. It is closer from appearance standpoint at least than its contemporaries at McDonnell and Piasecki, both of which are flying prototypes, built to try out new designs. The XR-10 is more of a production aircraft design and is the second of its configuration built by Kellett.

▶ **Egg-Beater Rotor**—Its "egg-beater" rotor system of six intermeshing synchronized blades turning in counter-rotation from two hubs mounted close together on a common platform atop the fuselage has been tested already on the Kellett XR-8, a two-place copter designed by Richard Prewitt, at the time vice-president of engineering and principally responsible also for the XR-10 design. Synchronization of the intermeshing blades is maintained by a system of gearing developed by Prewitt from the original German Flettner intermeshing rotor helicopter design. Three of the XR-8s were built and flown for many hours to demonstrate the principle.

Successful performance of the Kellett XR-10 in further flight tests may bring prospects for commercial orders to Kellett. The XR-10 has been designed with commercial possibilities in view, as is customary with virtually every military transport aircraft. A year ago, Kellett was inviting air transport companies to view two mockups of the XR-10 in a commercial version known as the KH-2, for 10 passengers and crew of two, and a cargo version carrying a ton of freight.

The company became over-extended financially and was forced to withdraw from all but its military commitments in the heli-

KELLETT'S NEW 12-PLACE HELICOPTER

copter field. But the picture has not changed in the last year as far as availability of 12-place helicopters is concerned. Only two helicopters have received commercial licenses from CAA, the two-place Bell 47 and the four-place Sikorsky S-51. An all-metal production version of the McDonnell helicopter could be a strong competitor, but there appears no immediate prospect for such an aircraft.

The XR-10 drives its rotors by shafts which extend up from the engine nacelles alongside the fuselage to the rotor heads, shown exposed in recent test photos, but designed for fairing coverings.

Either engine will turn both rotors. The helicopter will fly with a single engine, assuring a safety margin, in event of one engine failing, which has been offered in helicopters only by the XHJD-1.

Service ceiling of the XR-10 is estimated at 18,800 ft., less than 1,000 ft. below the international helicopter altitude record of 19,167 ft. set by Maj. E. M. Cassell, AAF, Feb. 10 at Patterson Field, Dayton, in a Sikorsky R-5-A. Since the service ceiling is not absolute ceiling, it is possible that the army may attempt to better the record.

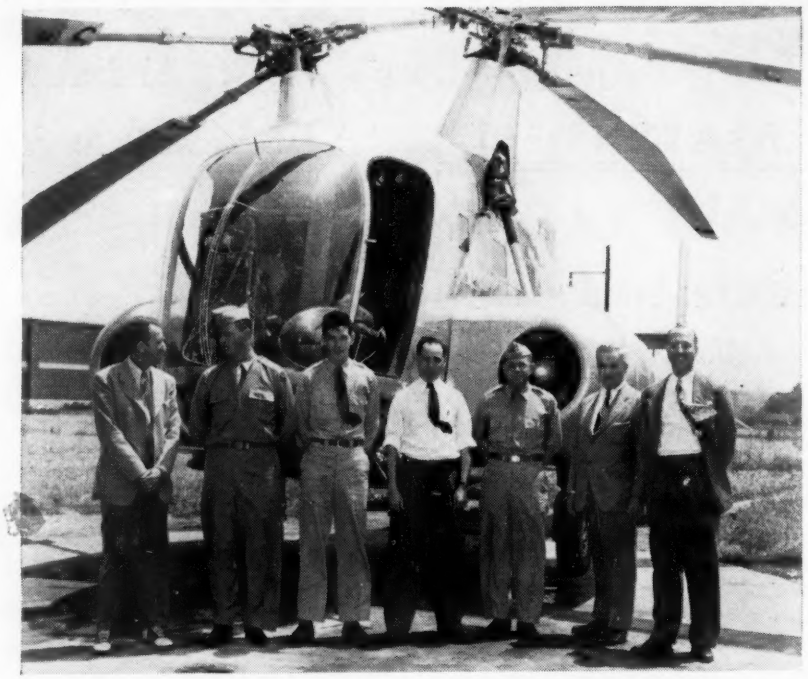
Other XR-10 specifications: Rate of climb, 1,650 ft./min.; disc loading, 2.96 lb./sq. ft.; power loading, 10.74 lb./hp.; rotor blade area, 290 sq. ft.; disc area, 3,710 sq. ft.; design gross weight, 10,997 lb.; weight empty, 8,204 lb.; useful load, 2,793 lb.; fuel capacity, 180 gal.; hovering ceiling, 6,000 ft.

Comparison of the three large twin rotor helicopters indicates Kellett has gained an advantage in smaller total span of its two rotors by setting its rotor heads close atop the fuselage, so that the two rotor diameters largely overlap. Engines are placed outside and do not occupy valuable cabin space, yet they are faired against the fuselage sides so there is no need for extra structure.

McDonnell mounted rotors on pylons extending from the fuselage in a configuration similar to the American Platt-LePage and German Focke helicopters. Engines also were contained in nacelles halfway out on the pylons. Originally the McDonnell design had total rotor span of 81 ft. Recently the first 40 ft. rotors were replaced with 46 ft. rotors which overlap slightly. The span is now 87 ft. McDonnell's helicopter design gross weight was approximately the same as for the XR-10, but recently with the larger rotors the XHJD-1 lifted 12,800 lbs. total, or nearly a ton more than its design gross weight, probably setting an unofficial international record.

The Piasecki design mounts its twin rotors in tandem, at nose and tail of the fuselage, with the powerplant buried in the center of the fuselage. This design eliminated the drag resulting from exterior pylons and nacelles, but requires cabin space for powerplant and fuel installation. A larger twin-engine Piasecki design, using the same fore-and-aft configuration with engines mounted at both ends, is reported under development. The XHRP-1 now flying can carry more than a ton of useful load, and accelerate to speeds of more than 100 mph. It provides more than 400 cu. ft. of useful space at its center of gravity.

When Kellett was exhibiting its mockups to potential air transport customers last summer the company estimated the commercial version could be built at a price comparable to that for all-metal fixed-wing twin engine transports with similar interior fittings. Presumably a complete re-evaluation of costs would be necessary as a result of changes in many cost factors since. Original Kellett army contract called for only two XR-10s. However it is possible that this order may be increased, if not already, in view of the craft's showing in its first trials.



FIRST FLIGHTS OF XR-10—Pleased with results shown in first flights of the Army's new Kellett XR-10 twin-engine helicopter, which carries 10 persons besides a crew of two, are Kellett and military officials who conducted the flight tests at North Wales, Pa. Left to right: J. D. Driskill, Kellett pilot; Col. A. T. Culbertson; A. W. Bayer, co-pilot; L. L. Douglas, chief engineer; Maj. W. C. Dodds, P. R. Skilling, trustee for the Kellett Aviation Corp., and L. C. Peskin, helicopter division manager. (AAF photo).

First Stratocruiser

First Boeing Stratocruiser was to make its initial flight last week and will be joined next month by the second ship off the line in a test program of 50,000 miles flying that, it is hoped, will bring CAA certification the Fall. Number two airplane will be the first of 20 ordered by Pan American Airways. While the first two planes are being put through the test paces, Boeing will be outfitting the other PAA Stratocruisers.

Boeing's orders for the Stratocruiser total 55, plus one AAF version, YC-97B. Cost of the basic airplane is $1,250,000 for the 80-passenger version, with a labor escalation clause, and plus modification costs. None of the six airlines buying the plane—PAA, Scandinavian Airlines, United, Northwest, American Overseas, British Overseas—is getting the 80-passenger plane.

Matson Stops Service

Matson Navigation Co. has discontinued its nonscheduled DC-4 service between the Pacific Northwest and Honolulu but will continue to press its application for a CAB certificate authorizing scheduled operations over the route.

Second XB-35 at Muroc

Second of the Northrop XB-35 flying wing bombers has been delivered to Muroc Army Air Base for test flying. The ferrying flight was unexpected, since high speed taxi runs were planned. Fred Bretcher, who served as copilot on initial flights of the first XB-35, had Max Stanley as copilot and O. H. Douglas, flight engineer. Stanley was pilot on the maiden flight of the first XB-35.

Morris Leaves Bendix

C. L. (Les) Morris, assistant to the president of Bendix Helicopter, Inc., resigned late last week. Though he has not announced future plans, it is understood Morris will probably stay in some phase of aviation.

Morris was Commissioner of Aeronautics for Connecticut ten years before joining Sikorsky Div. of United Aircraft Corp. as its first helicopter test pilot. He organized and headed the division before being made assistant to the president.

AAF Generals Hail B-50 As New Standard Superbomber

First flight tests at Seattle successful; 425 mph top speed, better than 300 mph cruise and external bomb load add striking power.

Top AAF generals view the new Boeing B-50 as a competitor of the Convair B-36 on the basis of strategic striking power, after successful completion of early B-50 test flights at Seattle. Lt. Gen. N. F. Twining, Air Materiel Command Chief, regards the B-50 as "the Air Forces new standard long-range bomber" and Strategic Air Command generals look on acceptance of the B-50 into service as a healthy increase in AAF hitting power.

Although available data indicate a disparity in range and bombload between the B-50 and the B-36, the 425 mph top speed and better than 300 mph cruising speed of the former renders it a potent factor in offensive power. Over its range of 5,000 miles, the B-50 can carry seven tons of bombs to the target in four hours less time than the B-36 carrying the same load. This enables the B-50 to complete five missions while the B-36 is completing four, although delivering only one-third the bomb load at reduced range. This speed indicates a potential usefulness for the B-50 as a fast-strike strategic bomber as compared to the heavier but slow-strike capabilities of the B-36.

The B-50 on Takeoff

► **High Altitude "Specs"**—High altitude specifications of the B-50 have been reduced on the basis of wartime B-29 experience, which proved the cost of 30-40,000-ft. operation excessive in engine life and airplane performance. The B-50's Pratt & Whitney Wasp Majors carry only one General Electric CH-7A turbo-supercharger each, compared to two on the B-29, to provide rated altitude output at the 12-15,000-ft. level. Ceiling of the B-50 is better than 35,000 ft., however, due to the 59 percent increase in power over the B-29.

Special attention has been devoted to reducing landing speed in the B-50 due to the 15,000 lb. increase in normal gross weight, most of which goes into increased fuel capacity demanded by the larger engines. The outboard nacelle afterbodies have been enlarged, matching the inboard design, thereby providing increased flap area and reducing the final approach speed. Curtiss Electric reversible pitch propellers cut the landing run to about one-third.

► **Rudder Boost**—A major innovation in the B-50 is power-boosted rudder control system. Considerable design effort was expended on the B-29 to produce an aerodynamically balanced rudder requiring no boost. This rudder proved to be near the maximum size permissible for no-boost operation. Increased rudder size of the B-50 has necessitated power-boost, although efforts are continuing to eliminate this feature through proper design of the rudder leading edge, possibly by the use of a sealed-gap arrangement.

Thermal de-icing control is used throughout the B-50 to enhance its all-weather characteristics. The "hot wing" de-icing system is operated by three Stewart Warner combustion heaters located in each outboard nacelle, instead of utilizing engine exhaust gas as in conventional installations.

Two heaters are located in the dorsal fin to provide de-icing for the fin, stabilizers and the rudder. This is the first control surface to be equipped with thermal de-icing. Two other heaters are used to provide hot air for the pilots' windshields, the three sighting blisters in the aft fuselage and the tail gunner's window. Propellers are equipped with electrical de-icing equipment.

► **Bomb Load Varies**—Bomb load of the B-50 remains substantially the same internally as the B-29—20,000 lbs. maximum—because this limit is set by space rather than disposable load requirements. Increased fuel capacity, possibly as high as 10,000 gals. max., is indicative of the increased load-carrying ability of the B-50. This has raised wing loading from 68.5 to more than 77 lbs./sq. ft., with consequent adverse effects on landing speed, rate-of-climb and ceiling.

Increased engine power and wing structural strength enables the B-50 to carry an increased external bomb load at reduced range. Although the B-29 carried no external bomb provisions, the additional power of the B-50 would permit an additional 20,000 lbs. to be carried externally, thereby doubling the bomb load over short range.

Although present plans are to install .50-cal. machine guns in the B-50's four remote-control turrets (four .50's in the front upper turret), studies have been completed on the adaptation of the mounts for twin 20 mm cannon, installation of which will depend on the outcome of Wright Field armament tests. B-50 tail turret retains the 20 mm cannon of the B-29.

► **Photo Version**—As a photo-reconnaissance plane, the B-50 can be modified to a 10,000 mile range with an endurance of 35 hours. Normal maximum range is slightly more than 7,000 miles without bombs. Top speed, at light weight and altitude, is near the 450 mph mark with normal maximum at combat gross weight of better than 400 mph.

Outboard wing panels and tail assemblies are being manufactured at the Boeing Wichita (Kansas) division with fabrication of other assemblies and final assembly and flight test taking place in Seattle. A total of 133 is on order with production expected to reach three per week this fall.

New Air Force Facilities Sought

Legislation to authorize a major War Department public works program, estimated at $225,000,000 for the 1948 fiscal year, has been introduced by Chairman Chan Gurney (R., S. D.) of the Senate Armed Services Committee.

The measure would permit completion of a supersonic wind tunnel at the California Institute of Technology, establishment of rocket static test facilities and all-altitude speed course at Muroc Army Airfield, construction of rotor wing testing facilities and testing laboratory, central heating plant and scavenging building for a wind tunnel at Wright Field.

The measure, providing housing facilities for most army installations, both Continental and Overseas, also would authorize these aviation projects:

- **Alamogordo, N. M.**, Airfield—Rocket-firing facilities;
- **Kelly Field, Tex.**—Helicopter engine-testing facilities;
- **Marietta, Ga.**, Airfield—Control tower;
- **Rapid City, S. D.**, Airfield—Development of facilities for VVHB;
- **Roswell, N. M.**—Training facilities.

Air Safety Board Studies Plane Fires

Step follows recommendations for terrain clearance indicators and new altitude minimums

By ROBERT HOTZ

Aircraft fires and low flying were under scrutiny last week by the president's special air safety inquiry board after a new series of recommendations urged that all transport aircraft be required to carry electronic terrain clearance indicators as soon as possible. A compliance date of next January was originally suggested for this requirement but the board refrained from setting a specific deadline.

Basing its latest recommendations on a study of the Capital Airlines (PCA) accident near Leesburg, Va., where a DC-4 struck 150 feet below the crest of a mountain ridge, the board also asked that flight rules be revised to increase minimum altitudes to be flown over rough terrain.

▶ **Several Devices**—Electronic terrain clearance indicators were recommended after the board flew in a TWA Constellation equipped with the radar device for terrain clearance warning now being manufactured by Hughes Aircraft Co. of Culver City, Cal. The $135, 16-lb. device is being installed in the TWA fleet and some planes of Continental Air Lines. Other devices that would meet Board requirements are a new 150-lb. airborne scope radar set developed by the Navy and American Airlines; the Allison 65-lb. scope radar and wartime radio altimeters that are now selling as surplus for as low as $75.

An increase in altitude now required for terrain clearance under instrument conditions west of 104th meridian and over the Appalachians to 2,000 ft. was advocated, with the 1,000-ft. clearance remaining for daylight contact flight and over characteristically level country.

▶ **NACA Role**—The National Advisory Committee for Aeronautics was asked to monitor studies of mountain terrain effects on aneroid altimeters now under way by University of California and AAF in California. NACA is to evaluate results of these studies and submit recommendations on accuracy of aneroid altimeters.

The board took time out from its executive sessions to blast congressional slashes in air safety funds and to hold an open hearing on proposed permanent revisions in maximum take-off weight calculations for the DC-4 (AVIATION WEEK July 7).

▶ **Services Agree**—Both AAF and Navy agreed with the proposed CAA program for 68 units of high intensity approach lights; 23 units of GCA, 25 surveillance radar sets. Navy indicated no interest in ILS and AAF said it would use ILS only as a secondary aid in automatic landing of heavy transports and bombers. Recommendations to the board by the Air Line Pilots Association indicated the pilots were disturbed by location of some ILS installations on the "wrong" runways and lack of ADF compass locator stations at the inner and outer markers of the system.

▶ **Revise CAR**—In addition to the temporary revisions in gross weight take-off calculations for the DC-4 the board indicated it was considering ultimate revision of CAR 61.7122 and proposal of more interim recommendations as soon as conclusions could be reached. One of the big points at issue on the take-off weight formula computation is the slide-rule engineering calculations now in effect and backed by the airlines. Airplane pilots demand that actual flight tests be made with maximum loads in DC-4s to determine whether calculations are correct. Flight tests in Tucson, Miami and Mexico City have been proposed under high temperature factors at altitudes and in dry and humid climates. Lighted windsocks at both ends of all runways on all commercial airports have also been recommended by the board.

The board is also making an exhaustive investigation of design, manufacture, conversion and maintenance procedures on the DC-4 in connection with the Eastern Air Lines accident at Port Deposit, Md. Preliminary CAB report issued last week stated that examination of the wreckage revealed that "some unit or assembly of the empennage failed in flight". A second series of hearings on that accident opened last week.

CAA NON SCHEDULED FLYING ADVISORY COMMITTEE

Newly reorganized CAA Non scheduled Flying Advisory committee, photographed at meeting with CAA officials in Washington, includes from left: George Haddaway, publisher, Southern Flight, Dallas; B. Allison Gillies, aviation consultant, San Diego; Joseph T. Geuting, Jr. manager, Personal Aircraft Council, substituting for John Friedlander, president, Aeronca Aircraft Corp.; Don Flower, sales manager, Cessna Aircraft Co., Wichita; Dick Depew, Ludington-Griswold Co., Saybrook, Conn.; William L. Anderson, Pennsylvania aeronautics director; Lloyd Child, executive secretary of committee; T. P. Wright, Civil Aeronautics Administrator, William A. Mara, committee chairman, advertising and publicity director, Bendix Aviation Corp., Detroit; Fred E. Weick, vice-president, engineering, Engineering & Research Corp., Riverdale, Md.; Ed Williamson, president, Bearings Service Co., Seattle; Harry W. Playford, president, U. S. Airlines, Inc.; St. Petersburg, Fla.; Oliver L. Parks, president, Parks Aircraft Sales & Service, East St. Louis, Ill.; and Leslie Marsden, president, Buffalo (N.Y.) Aeronautical Corp.

CAA Budget Cut $5,613,306 For 1948

Congressional action was completed last week on a 1948 fiscal year Commerce Department supply bill setting a $119,234,814 budget for the CAA and a $3,000,000 budget for the CAB.

CAA's allocation was the low figure proposed by the Senate: $5,613,306 below CAA's 1947 fiscal year appropriation of $124,848,120; $70,759,186 below the President's request for a $189,994,000 budget; and $5,220,670 below the House-approved $124,455,484. House conferees on the Commerce appropriation, headed by Rep. Karl Stefan (R., Neb.) made no attempt to strike a compromise on the House-approved and Senate-approved CAA allocations, but eagerly embraced the low Senate figure to economize.

▶ **CAB Compromise**—CAB's $3,000,000 coming-year allocation is a compromise between the $2,500,000 proposed by the House and the $3,100,000 proposed by the Senate. The Board's budget, while $509,400 above its 1947 fiscal year allocation of $2,490,600, is $380,000 short of the amount asked by the President.

Despite its clamorings since the start of the year for improved air safety facilities, Congress made a $25,198,934 slash in the President's request for a $36,308,000 appropriation for CAA for establishment of new air navigation facilities. The cut means that plans for installation of 68 additional ILS sets, 23 GCA units and 25 surveillance radar sets, and other air safety installations, will have to be cancelled. The $11,109,066 allowed by Congress for new navigation facilities will preclude any additional ILS installations and will permit installation of only two additional GCA, four surveillance radar sets and two high intensity light systems. CAA's 1947 fiscal year budget for new navigation facilities—$19,622,200—was almost double the amount authorized by Congress for the coming year.

Following is a summary of other items in CAA's $119 million 1948 fiscal year appropriation:

• **Airport development,** $32,500,000. This is half the ..65,000,000 requested by the President and $22,500,000 below the $45,000,000 appropriated for fiscal 1947.

• **Salaries and expenses,** $72,923,248. This allocation, $1,841,764 above the amount approved by the House, carries with it a stipulation for a cutback in CAA administrative and supervisory personnel and an increase in operating employes. It is $11,187,752 below the President's requested appropriation. A compromise figure of $1,600,000 for CAA operation and maintenance of aircraft, a program which fixed-base operators have skeptically viewed as an encroachment on the private maintenance industry, is provided. The President requested a $2,050,000 appropriation, the House approved $2,000,000, and the Senate, only $1,500,000.

Boost Plane Funds

Senate Appropriations Committee last week added $203,490,000 in contract authorizations for purchase of new aircraft to the 1948 fiscal year War Department appropriation bill, over and above the $280,000,000 proposed by the Budget Bureau and approved by the House. This, unprecedented in the economy-minded Congress, would permit purchase of 1,100 new planes.

The group, spurred by Chairman Chan Gurney (R., S. D.) of the Armed Services Committee, also added $34,000,000 for aviation gasoline purchases to increase the AAF's flying hours by 4,000,000, and provided for an AAF strength of 55 air groups in ready status. Funds previously approved by the House would have allowed only 38 groups and 15 skeletonized groups.

In addition to the boost in contract authorizations for planes, the Senate committee added contract authorizations of $7,000,000 for radar and a like amount for guided missiles. This gives AAF total contract authorizations of $497,490,000, and a total budget of $1,355,933,591, as against a fiscal year 1947 appropriation of $1,064,500,000.

• **Technical development,** $1,600,000. This is an increase over CAA's 1947 allocation of $923,000, but less than half of the $3,500,000 budget requested by the President.

• **Washington National Airport,** $1,102,500. This is $233,000 above the airport's 1947 fiscal year budget of $869,500, and $27,500 above the President's request for $1,075,000.

Air Group Studies New Defense Plan

A new appraisal of national defense policies on aircraft production is being prepared by the Air Coordinating Committee, following release of its first report on the subject nearly two years ago. The new study for completion early next year.

Whereas the earlier report was prepared against a background of reconversion, the new report will consider the problem of expansability of the industry in a national emergency in light of the present low level of military procurement.

▶ **Stanford Study**—The new study will be prepared by Stanford University Research Institute on the basis of field studies by staff personnel, many of whom participated in the previous report prepared by Harvard Business School. The Stanford report will be integrated with simultaneous studies by the AAF Air Materiel Command and the Navy Bureau of Aeronautics to produce the formal ACC recommendations to the President. The AMC and Bu-Aer researches will be confined to the probable requirements of the services and related defense aspects of the problem.

The need for a new report has been created by changed strategic plans, failure of military procurement to reach minima used as the basis for the earlier recommendations, and greatly curtailed production of civil types, according to Garrison Norton, Assistant Secretary of State and ACC chairman. The new report is expected to reveal the Nation's vulnerable strategic position, the degree to which the industry must expand almost overnight in the event of attack, the types of advanced industrial preparedness measures needed and the volume of peacetime procurement necessary to maintain the necessary degree of expansability.

LIGHTPLANE RACE ENTRY

Built by group of Lockheed engineer-pilots, Cosmic Wind is slated for lightplane events at coming National Air Races. Gross weight is listed at 800 lb., and high speed is estimated at approximately 200 mph. Glen Fulkerson, one of Lockheed group which built plane, is in cockpit. (Press Ass'n photo)

South Americans Bid For Local Markets

Designers in several South American Countries have produced plans and prototypes for local markets.

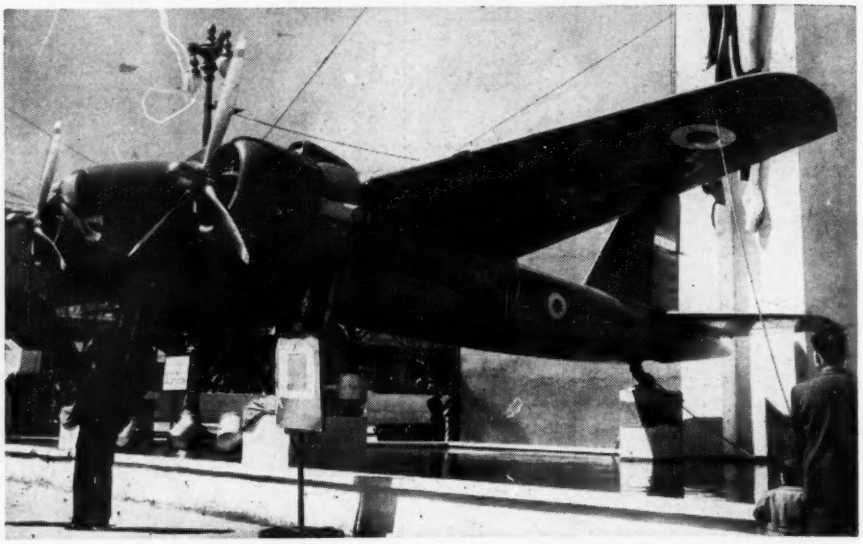
A four place monoplane designed by Pablo Banaudegui, Pando, Uruguay, bears a striking resemblance to the Stinson Voyager, is powered by a 125-hp. Lycoming and features a wire braced steel tube fuselage, spring loaded flaps, and wing slots. The landing gear is retractable.

A tandem trainer, admittedly a copy of the Piper Cub, is being produced by the Companhia Aeronautica Paulista, Sao Paula, Brazil. It is powered by a Lycoming 65 hp. engine. Over 400 of these have been produced to date with current schedules calling for 50 units per mo.

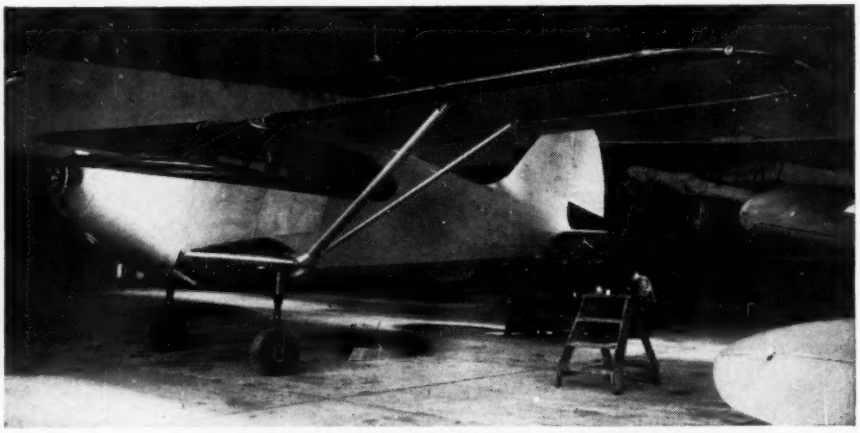
▶ **Transports and Fighters**—A single engine transport, similar to the old Stinson Reliant is being manufactured by the Peruvian airline Compania de Aviacion Faucett, S. A. Designed primarily for feeder and short haul freight work, these planes are reported to be more versatile than models currently manufactured in the United States.

The Argentina national aircraft factory at Cordoba is at present producing a fast medium bomber akin to the British Mosquito but modified to operate with twin Pratt & Whitney engines in place of the usual liquid cooled Rolls-Royce engines. The overall dimensions are those of the British fighter-bomber.

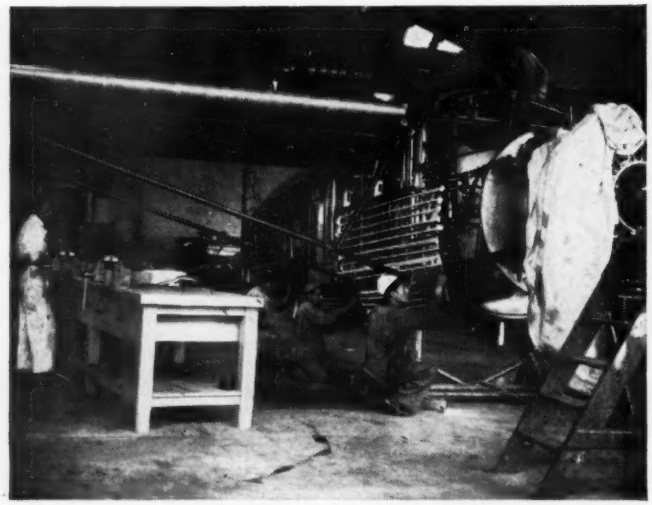
Characteristics reportedly remain about the same.



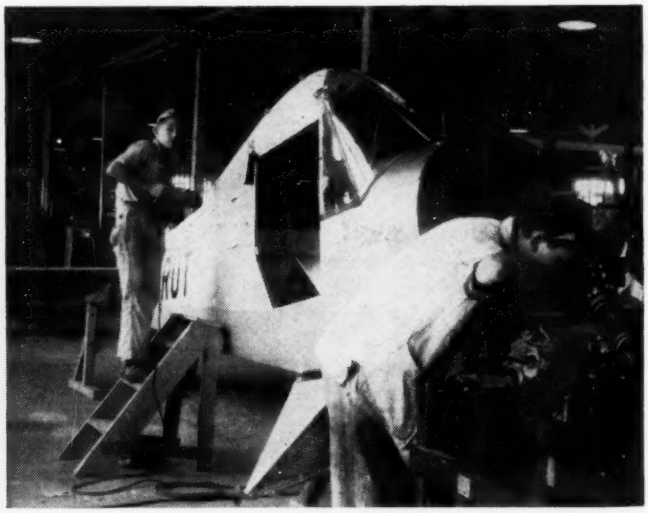
Argentine Version of the Mosquito



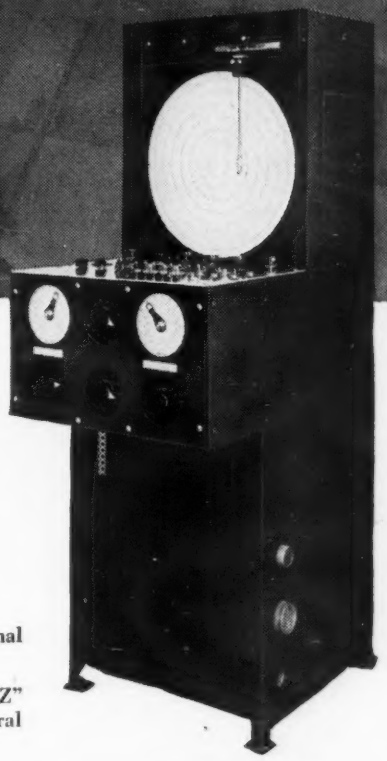
Uruguayan 4-Place Cruiser



Faucett's Peruvian Transport



Brazilian Copy of Piper Cub



Automatic Instrument landing system **now available** for use with Navigational Trainers

The Curtiss-Wright Dehmel Automatic Radio Aids Unit facilitates pilot training by its realistic simulation of various radio aids. This unit can be used with all types of navigational trainers.

Other important features **... (1) Signals are *always accurately transmitted* to the pilot. (2) *For the first time* the combination of ILS, Radio Range Signals, and the ADF can be utilized simultaneously in a Trainer without addition of extra instructor personnel.**

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Further Airline Losses Seen As Summer Earnings Disappoint

Few carriers likely to have cushion against coming winter after first-of-year deficits; seasonal traffic slow in upturn.

The domestic airlines must generate substantial earnings during the current summer months if deficit operations for the year are to be avoided. For most carriers this promises to be a difficult task and most likely will result in the industry as a whole completing a second consecutive year of heavy losses.

For calendar 1946, the 15 domestic lines lost an aggregate of about $15.5 million. For the first quarter of this year, these same carriers are estimated to have had a net operating loss of more than $20 million. Eastern's net income of $3,504,643 in 1946 and $564,695 during the 1947 first quarter reduced the industry's losses to the amounts indicated.

▶ **Traffic to Vary**—Seasonal traffic fluctuations, smoothed out by war-inspired operating conditions once again will become more pronounced. Traditionally, the summer months, have always been the most profitable for the majority of the carriers. (Eastern and National, with their peaks during the winter months, are exceptions). More favorable flying weather and increased vacation travel are the primary stimulants to the highly profitable operations generally recorded during summer months.

This year, seasonal profits got off to a late start. The normal traffic upturn was very hesitant in exerting itself, as a direct result of the recent series of fatal crashes. Load factors, while not declining, failed to rise to any appreciable extent as was first anticipated. A mitigating circumstance is also found in the increased availability of augmented aircraft fleets. Most of the carriers did not experience their first profitable month this year until June, and then were estimated to have been in the black by only nominal amounts.

▶ **Summer Earnings Needed**—Accordingly, the industry must run up adequate earnings during the months of July, August, September and, if weather permits, October, to offset heavy deficits of the first four or five months of this year and leave a balance to ride through the winter months of 1947.

Very few airlines will be able to perform this feat this year. The reasons are not hard to find. As previously noted, the anticipated traffic upturn has fallen short of expectations, reflecting the aftermath of the recent accidents. However, as increased safety measures are implemented and confidence restored, airline traffic may again be expected to show a vigorous growth.

With a few notable exceptions, proper managerial control over operating expenses is not being realized and tends to reduce profit margins. It is possible that to a certain degree this condition is due to non-recurring circumstances. For example, the integration of new equipment into company fleets is an expensive process. By the same token, the failure of additional new type equipment to be delivered has proven very burdensome to the industry as it has been forced to operate with a very high percentage of high cost and relatively outmoded equipment. However, a dynamic favorable factor is present in the 10 percent increase in the basic passenger fare structure and the extra fares prevailing for the Constellation and DC-6 type equipment.

▶ **Safety Rule Influence**—Retarding the development of current earnings will also be increased expenditures and restrictive pay loads as a direct outgrowth of augmented safety regulations. Certain of these measures have been in the CAB procedural mill and others will stem from the President's Special Board of Inquiry On Air Safety. One such regulation is now in the process of being imposed. Weight limitations, resulting from the recommendation for the revision of the "wind-factor" formula used by the carriers in determining their take-off loads, may reduce payloads from 3,000 to 4,000 pounds.

Additional recommendations of a similar nature may be expected. They may be implemented into further regulation revisions calling for more frequent overhaul and check periods of engines and aircraft. Increased maintenance procedures may also be inaugurated. The installation of added radio and allied devices designed for increased safety may also be ordered. In the realm of possibility is the addition of a flight engineer or third officer on all four-motored equipment. In fact, this measure is being strongly urged by the Air Line Pilots Association. All this and even additional measures of a similar nature will serve to increase airline operating expenditures and drain current earnings. However, anything increasing the safety of air transportation will redound, in the final analysis, to the industry's long range benefit.

▶ **May Tighten 04**—It is highly probable that Part 04 of the Civil Air Regulations which deals with the certification of new planes for commercial service may be tightened. This may entail further delay and higher initial costs for the new type equipment not yet approved. This includes the Convair 240, Boeing Stratocruiser and Martin 202 and 303.

As final profits for 1947 become more remote, considerable revision of this year's first quarter reports will be in order. A number of the major carriers have tended to reduce or minimize first quarter losses by arbitrary tax "credits". This was done on the assumption that profitable results for the final year would ensue and it would be fair to equalize the tax burden over the entire year. However, in the failure of earnings to develop to the extent sufficient to offset previous tax "credits", it is obvious that first quarter deficits will be adjusted to even larger amounts.

▶ **Expired carry-back**—These tax "credits" must be distinguished from the "carry-back tax credits" which were operative last year and which expired for all companies having their calendar year ending Dec. 31, 1946. Only those companies whose fiscal years end at periods other than the calendar year are in a position to avail themselves of the "carry-back tax credit". One such company is Northwest Airlines, which had its previous fiscal year end at June 30. As of March 31, 1947, this carrier showed a tax carry-back credit of $673,890. The company recently changed its fiscal period to coincide with the calendar year but is expected to retain the tax credits.

United Air Lines, for example, reported a net loss of $3,450,671 for the first quarter of 1947 after a tax credit of $1,921,000. Unless sufficient earnings develop to utilize this credit, the first quarter figures may have to be adjusted to a net loss of $5,371,671. American has also taken a tax "credit" of $2,220,000 to reduce its first quarter loss to $3,073,636. Braniff, for the same period, has made an accounting tax "credit" of $72,000, bringing its loss to $510,364. PCA and TWA evidently conceded their dismal profit outlook by not establishing any tax "credits", reporting net losses of $2,309,705 and $5,723,523, respectively.—**Selig Altschul.**

Minneapolis-Honeywell Grants Pay Raise

A 20 cent per hour wage increase for factory employees and extension of the present labor contract to Feb. 1, 1949, has gone into effect at Minneapolis-Honeywell Regulator Corp. in Minneapolis.

A joint statement by S. M. Sitz, industrial relations manager, and R. I. Wishart, union leader, said: "This increase follows an increase of 10 cents an hour, provisions for paid holidays, three-week vacations for ten-year service, and other benefits agreed upon in March."

Since early spring the company has laid off about 1,300 employees because of slowdowns in the heating and construction industries, bringing current employment to about 4,200 workers.

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FIG. 1

P4 Bearing for NAS 376-2-4 Pulleys
P5 Bearing for NAS 377-1 Pulley
P10 Bearing for NAS 376-3-5 Pulleys

FIG. 2

PD5 Bearing for NAS 377-2-3-4 and NAS 378-1 Pulleys

FIG. 3

P8 Bearing for NAS 378-2-3 Pulleys

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BRG. Nº.	BORE +.0000 -.0005	OUTSIDE DIAM. +.0000 -.0005	WIDTH OUTER RING +.000 -.005	WIDTH INNER RING +.000 -.005	O.D. INNER RING	OUTER RING CHAMFER +.015 -.000	INNER RING CHAMFER +.015 -.000	REQD STATIC RATING LBS.	FIG. Nº.	EST. WT. LBS.
P4	.2500	.8750	.3750	.4375	.465-.375	.022x45°	.005x45°	920	1	.04
P5	.3125	.8750	.3750	.6250	.465-.435	.022x45°	.005x45°	500	1	.04
PD5	.3125	.9375	.5625	.6250	.515-.485	.022x45°	.005x45°	2500	2	.07
P8	.5000	1.6875	.5625	.7500	.800-.750	.032x45°	.015x45°	7000	3	.24
P10	.6250	1.1875	.3750	.4375	.800-.750	.022x45°	.005x45°	920	1	.06

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Freak "Supersonic Sickness" Threatens Jet Engine Testers

Newly discovered malady attacks only those working near engine tailpipe; pilots not affected. Caused by impact of ultra-high sound waves.

By WILLIAM KROGER

Army, Navy and some manufacturers cautiously are preparing reports on ultra-high frequency sound waves that affect humans—a freak by-product of the testing and operations of jet engines that, while apparently not dangerous, is new enough to be studied with the utmost care and a great degree of secrecy.

Commonly known as "supersonic sickness," the malady takes the form of general lassitude, unsteadiness in walking and, sometimes, nausea. It apparently has no lasting effects and attacks only those working within a rather narrow cone around the tailpipe of a jet engine. AAF and the Navy admit some of their engineers have been stricken; engine manufacturers report no cases, but at least one airframe manufacturer has had experience with the phenomenon.

▶ **Jet Pilots Safe**—There is no anticipation that the sickness will hit pilots of jet planes, both because they can be shielded and because they are out of the cone. Jet engine manufacturers seem so far to have had no trouble with it because they do their testing in enclosed cells. One, however, has reported that a glass window in a test cell was cracked by the ultra-high sound waves.

Airframe manufacturers engaged in construction of jet planes seem to be the most interested parties. At least one, who tests jet engines out of doors, had an engineer who became sick after he had been working close to the tailpipe for some time. Because of personnel problems relating to potential personal injury claims, airframe manufacturers are maintaining an understandable silence, although there is a possibility that supersonic sickness may be discussed at a meeting to be held shortly.

▶ **Vibration is Cause**—The cause of the sickness is the high-pitched vibration emitted by the escape of gases from the tailpipe of a jet engine. These are far above the range of human hearing—like the trick dog whistle that a dog can hear but a man cannot.

The effects of high frequency noise has been the subject of extensive study throughout the war by both AAF and the Navy's Bureau of Aeronautics. These studies indicate that the auditory mechanism can literally be torn apart by steep front pressure waves such as the supersonic shock waves emanating from a jet engine.

The high frequency sound waves potentially are capable of doing two-fold damage. The hearing can be impaired by the shock's blasting the ear-drums, or the vibrations can affect the nervous system. In the few cases so far reported, damage to the hearing was only temporary.

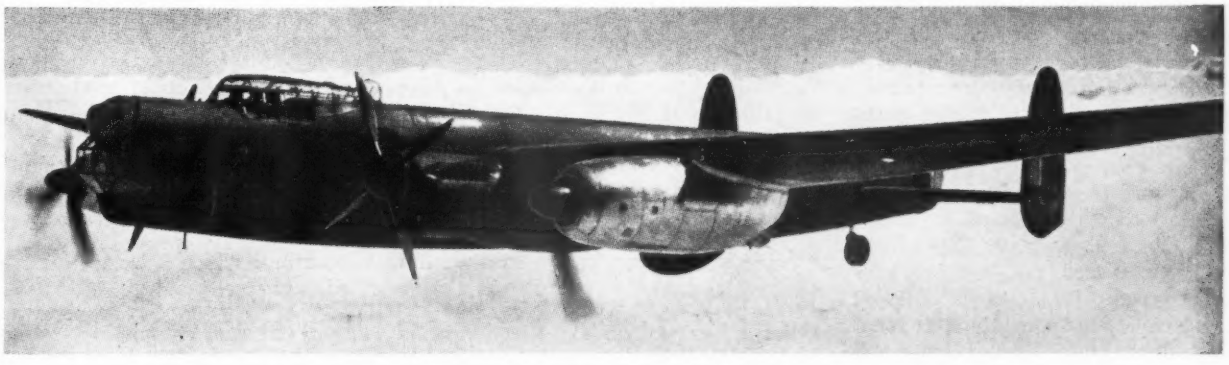
▶ **Impaired Hearing Reported**—Dr. Paul O. Greeley, head of the Aero Medical Laboratory of the University of Southern California, says that to his knowledge only cases of impaired hearing have been claimed. He also states that "not enough is known of the behavior of ultrasonic waves for us to be positive that they are damaging."

That same cautious approach is manifested among Army, Navy, and manufacturing personnel queried by AVIATION WEEK.

While not confirming that the supersonic sickness is a problem, all parties are examining it, and possible counter-action, closely. One proposed solution is an ear plug designed to attenuate the high pressures, thereby relieving the auditory nerves of the shock. But this solution also contains a problem. The plugs must be made of high density material, but the material itself has to be one that will not vibrate in harmony with the noise waves. If it did, it would only aggravate the harmful effect of the noise.

▶ **Far-reaching Study**—An indication that the study of supersonic sickness is far-ranging was a speech by Gen. George Kenney in Boston recently. He posed the question, "What about the use of sound as a weapon?", then stated, "An airplane equipped with a sort of super dog whistle conceivably could fly around a city for a while and upset the nervous systems of the whole population."

The strange effects of jet engine noise



BRITISH GROOM TURBOPROPS FOR FUTURE COMMERCIAL USE

Tests of Bristol Theseus turboprops on this Avro Lincoln bomber is in keeping with British move to develop turbine-propeller power plants for use on medium speed commercial transports. Reciprocating type inboard engines have been cut and props feathered while outboard turboprops are put through their test paces.

have been manifested also in England where a worker in the engine plant of De Havilland reportedly was taken sick. Concurrent with this was a claim by British scientists that they could kill a rabbit at 100 yards with a "sound gun."

The various studies of the effects of the high frequency vibrations from jet engines have been intensified only recently in the U. S. However, the Germans ran into these effects early in their jet engine program during the war and conducted extensive tests with concentration camp inmates to try to determine all possible results on humans of these vibrations.

New Research Project To Probe Propellers

Research toward development of propellers that will operate continuously at supersonic speeds, regardless of the forward speed of the airplane on which they fly, will be undertaken by the University of Illinois Aeronautical Engineering Department, under a contract with Aeroproducts Division, General Motors Corp., Dayton, Ohio.

The new research problem, if successfully solved, would eliminate the main limiting factor of propeller usefulness, the compressability problem at high tip speeds, and would put the propeller back in the running for use n ihigh speed aircraft well beyond the speed ranges for which it presently is considered useful.

Construction is now under way at the University of Illinois Airport, Champaign, Ill., on a flow laboratory for instruction and research, which will include a supersonic wind tunnel which may operate at a maximum of mach 3 or three times the speed of sound. Compressors adapted from Army surplus aircraft engines are designed to develop a total of 28 lbs. of air per second at a pressure of 140 lbs. per square inch, for the tunnel.

Goodyear Canning Contract

Allotting 150,000 sq. ft. of space in its Akron Airport plant for participation in the Navy's new "canning" program, Goodyear Aircraft Corp. will begin to assemble 28-ton corrugated steel containers for preserving over 2,000 surplus planes in fly-away condition for periods up to five years. Fabrication of the container 10-ft. panel components is being done by the Youngstown Steel Door Co.

Craft valued at $150,000,000 will be housed, wings folded, in the sealed units linked in groups of four to six equipped with de-humidifying apparatus, at six Naval air bases. It is estimated that 444 cans will accommodate 800 fighters, 450 attack planes, and 750 trainer and utility craft including some twin-engine ships.

Navy considers the canning process superior to sprayed plastic "cocooning," it is reported.

Industry Observer

► Look for the world speed record holding Lockheed P-80-R to make an early attempt to better its 623.8 mph mark. Experts believe it can push the record past the 630 mph mark with relative ease under favorable conditions but the next five mile jump required for a record will prove a tremendously difficult hurdle for some time to come. Meanwhile Republic is grooming a P-84 for another record attempt this summer at Muroc before the P-80-R boosts its mark.

► AAF top brass are plenty worried over what the Russians are doing to the ME 262, German twin jet fighter. Intelligence reports indicate the Russians are making them faster than German wartime production and Wright Field tests indicated even the older 262 model in AAF hands could outperform the P-80. As a result Hughes Aircraft Co. now has contract for exhaustive engineering and flight tests on a captured 262 and C. C. Moseley's Cal Aero Technical Institute is running tests for AAF on the Jumo 004 engine that powers the ME 262.

► Douglas is about to build a new twin jet fighter for the Navy. Project is waiting on final contract negotiations. It will be the first Douglas fighter since the XFD-1 biplane of 1933.

► Eight remote control turrets on the Convair B-36 will house two rapid fire 20mm. cannon to be installed at Wright Field. This is first U. S. movable 20mm. aircraft mount although Russians used them on their four engined TB-7 bomber and the British has 20mm. turrets on the Avro Lincoln.

► NACA will flight test some new and interesting light planes in the fall if preliminary research indicates possibilities of fundamental improvements particularly on two-control and twin boom pusher types.

► Grumman has completed design studies of a 25 ton, twin-engine amphibian aimed at Navy cargo or 32-passenger civilian use.

► Los Angeles Airways Inc. recently awarded CAB's first experimental helicopter mail certificate, saved $86,000 on purchase of its four Sikorsky helicopters by ordering them last fall when the price was $48,500 apiece. Today's pricetag on the S-51 is $70,000.

► Look for the airlines to make extensive studies on the use of wartime radar fouling devices known as "window" for possible commercial application on radar airways. Ejection of the tinfoil "window" cards may be used as a distress signal or for positive identification of lost aircraft since it shows up like a neon sign on radar scopes.

► Extra power developed by the Allison Model 400 (modified J-33-21) jet engine used in the P-80-R record run is causing some airframe manufacturers now designing planes around the axial flow TG-180 (J-35) to take another look at the rotary compressor turbojet. Engineers believe that eventually the J-35 will be the better engine but currently the J-33-21 has more power and is considerably lighter, making it a better bet in the multi-jet bombers now heading for immediate production.

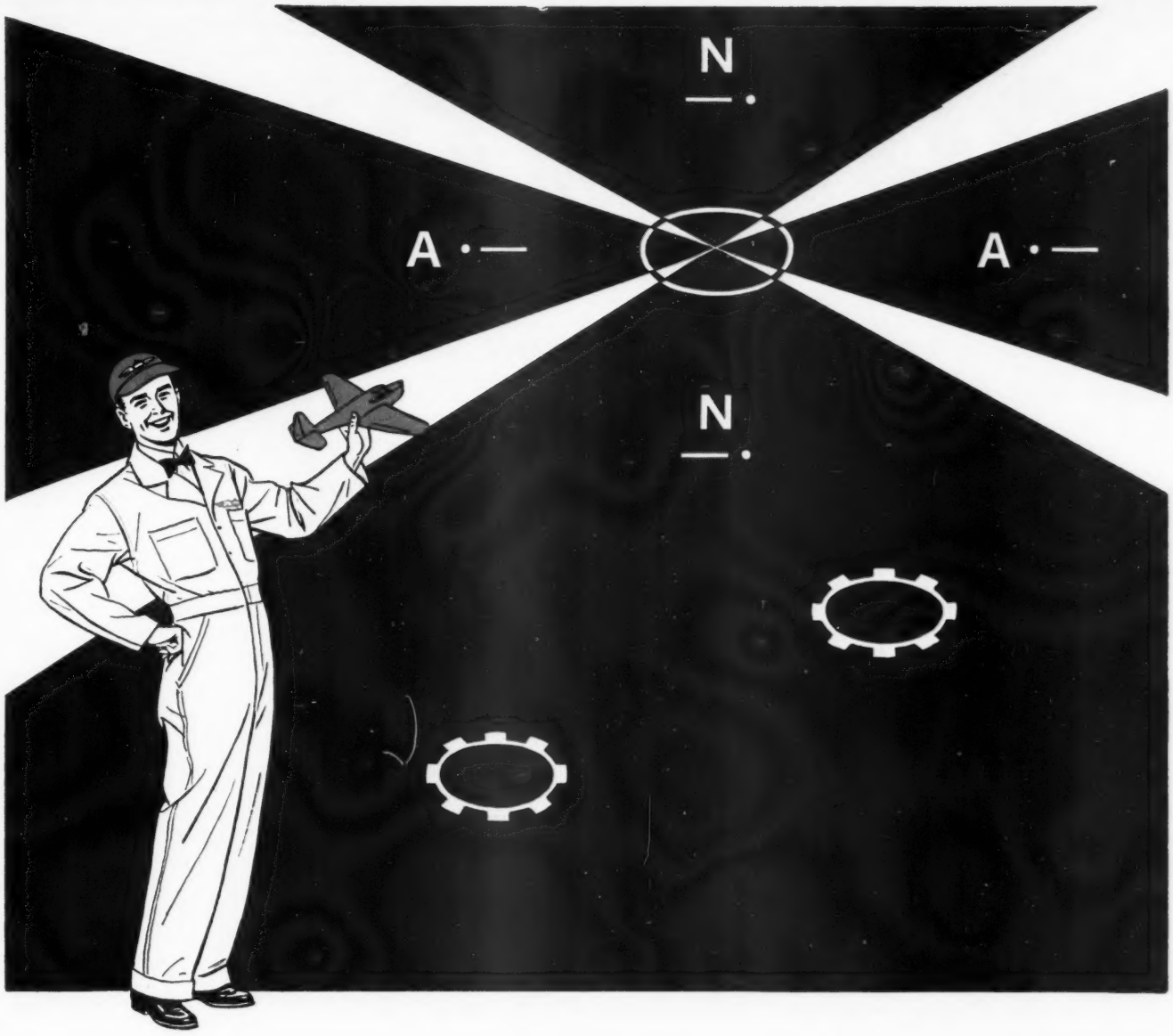
► Jack Northrop apparently is convinced that his flying wings are going to be part of the aircraft industry for some time to come. After building 13 types of flying wings since 1929, he has adopted the term "flying wing" as trademark of his company, Northrop Aircraft Inc.

► Vickers' supermarine attacker has a top speed of 590 mph at sea level decreasing to 538 mph at 30,000 ft. Normal cruising is 380 mph. Carrying 580 imperial gallons of gas, its range is 1,100 miles. Initial rate of climb is 6,600 ft. per minute with a service ceiling of 51,800 ft. Armament consists of four 20mm. cannon in the wings and a 2,000 lb. bombload or four 300 lb. rockets. It is powered by a single Nene I jet engine.

► Navy is experimenting with aluminum alloy armor which appears to be more effective and considerably lighter than conventional steel plate.

► Beech has two Model 34 feederliners in various stages of completion. Second is undergoing static tests at present and the other is being readied for flight testing.

► Wright Field experts expect to encounter compressibility problems in the new high speed bomber series—XB 45-48—as low as mach .7 because of induced high velocity air flow around engine nacelles, canopies, wing fairings and fillets. They also feel that power plants available in the immediate future will not provide the combination of power and range required for supersonic bombers.



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Internal Aerodynamics Opens New Speed Fields

Proper handling of supersonic airflows inside power plants held capable of reducing ramjet fuel consumption to reciprocating engine-levels.

Internal aerodynamics, a new field of technical specialization, may offer the most immediately effective path for improvement of jet aircraft performance. Rapidly emerging importance of this new field is indicated by the recent formation of a special Subcommittee on Internal Flow by the National Advisory Committee for Aeronautics to recommend special research programs in the science of handling air inside the airplane.

Pointing up the increasing magnitude of the problem is the fact that a 10% increase in air handling efficiency in a standard turbojet engine could mean a 30% increase in thrust output or a reduction in fuel consumption saving as much as 525 gal. of fuel in a 4-hr. Lockheed P-80 flight.

Of tremendous future importance is handling of supersonic air flows, research on which is still in the experimental stage. Success of the supersonic ramjet engine depends greatly on its achieving a compression ratio of 8-to-1 or more, merely by its passage through the air. This could mean a 300% gain in pressure ratio and a corresponding 100% reduction in fuel consumption over the subsonic jet engine to a figure as low as 0.5 lb. of fuel per lb. of engine thrust per hr., making the ramjet engine economically competitive with the conventional reciprocating engine.

Indicative of the potential gains in aircraft performance and economy that can result from increased internal aerodynamic efficiencies are these facts:

▶ Jet aircraft already must handle as high as 15 tons of air per min. internally with immediate prospects of this figure climbing to 50 tons per min.

▶ From 60 to 80% of the power of a turbojet engine is utilized for air handling alone.[1]

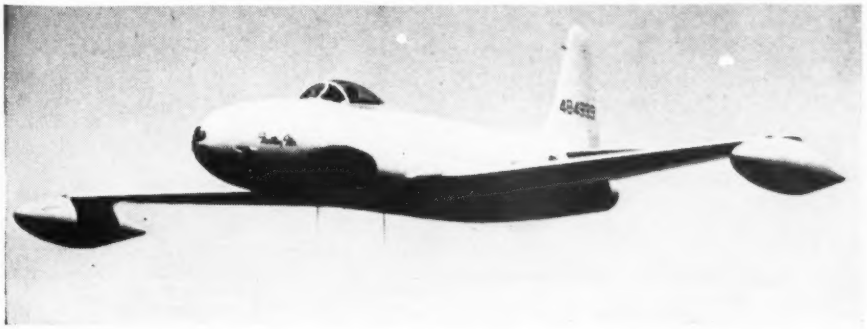
▶ From 30 to 70% of the sealevel power output of an aircraft power plant must be dissipated in the form of heat.[2]

Although it is a new field, fundamental research data are already available making possible the design of an internal airflow system with no increase in drag over the basic streamline form the airplane.[3] Wing inlets may now be designed which can actually improve the aerodynamic characteristics of the wing.[4]

Internal aerodynamics is sharply divided in two fields of specialization: first, subsonic air handling (for both reciprocating and tubojet engine systems) and, second, supersonic air handling (for the various forms of jet engines). While the subsonic case is fairly well uderstood up to critical Mach numbers, extensive research is being pressed to develop basic theory and practical design data for supersonic internal aerodynamics.

The basic internal airflow system consists of an air intake (inlet, diffuser); an internal path (duct); a radiator (engine, turbine, oil cooler, etc.); and an outlet (tailpipe, nozzle). Each of these devices requires individual study with close attention to the relationship with the efficiency of the overall system.

▶ **Subsonic Internal Flow**—The turbojet engine sucks air at low speed (taxiing, takeoff and climb) but as forward velocity is increased to cruising speed, the airplane speed becomes approximately equal to the velocity of air entering the engine.[5] At higher flight speeds, ram pressure is developed and excess air is deflected around the airplane. The ratio of air inlet area to engine inlet area should provide a compromise which does not penalize either the takeoff or the high speed performance of the airplane.



WING AIR INLETS, as used on Lockheed P-80 leave nose of fuselage free for armament or photo equipment.

New Committee

Recognizing the increasing importance of internal aerodynamics in aircraft design, the NACA has just formed a special subcommittee on internal flow, with Joseph H. Keenan, professor of mechanical engineering at Massachusetts Institute of Technology, as chairman.

Members are: Col. Paul H. Kemmer, chief of engineering plans, AAF; Lt. Comdr. William Schubert, head of ram and pulse jet section of the power plants division, Navy Bureau of Aeronautics; Dr. Kennedy F. Rubert, director of NACA's induction aerodynamic laboratory at Langley Field; Abe Silverstein, chief of NACA's wind tunnel flight division, Cleveland; Walter Vincenti, Ames Laboratory, NACA; Dr. William Bolay, consultant, North American Aviation, Inc.; Prof. Howard W. Emmons, Harvard University; J. J. Jerger, pilotless aircraft division, Fairchild Aircraft; Dr. Stewart Way, research laboratory, Philadelphia Division, Westinghouse.

Most important design criterion is the ratio of air inlet velocity to free stream velocity. If these two values are the same, the streamlines will be nearly straight and a sharp inlet leading edge can be used, resulting in low drag. If this ratio is low, which is often the case with high speed aircraft, the streamlines may turn sharply outward and through approximately 90 deg. to resume their original direction, resulting in large drag rise. The general efficiency of an internal system is a compromise between external drag and internal loss and designer's attempt to hold the sum of these losses to a minimum.

▶ **Design Data**—Present practice is to locate the entrance to air ducts at a leading edge (fuselage or wing) because a pressure stagnation point exists which brings the air to rest with a minimum loss of total pressure.[4, 6, 7] All air intakes, such as engine cooling air, oil coolers, intercoolers, superchargers, etc., are normally grouped at this point, even when it is necessary to increase the cowling area.[6] A typical example is the Boeing B-29 installation.

Recent research indicates that jet engine nacelles are best located with their centerline along the wing chord[8] and not projecting too far forward of the wing leading edge, due to adverse affects on the drag, span-load distribution and longitudinal stability.[9] The North American XB-45, Convair XB-46 and Martin XB-48 deviated from these requirements because of structural limitations in current design practice.

The air inlet design with a nose shape of sufficient curvature to prevent breakaway of the flow over the duct lip over a range of flight attitudes has shown superior efficiency, as has an entrance large enough to insure small internal expansion losses.[10]

Wing air inlets offer convenient locations when the nose of the fuselage is used for armament, as in the McDonnell XFD-1 and

XF2D-1, or a reciprocating engine as in the Ryan FR-1. Proper design can avoid pressure peaks and maintain laminar flow resulting in preservation or actual improvement in critical compressibility speed, range of lift coefficients for low drag, maximum lift coefficient and the drag of trailing edge flaps.[4]

▶ **External Scoops**—When their use is mandatory, external airscoops can be designed with a drag as low as 1% of the total airplane drag[11] by following nose inlet design practice.[10] Afterbodies should be of sufficient length to avoid separation (4 to 11 times the scoop depth)[6] and best practice is to merge the scoop afterbody into the nacelle, as in the Martin XP4M-1, or fuselage, as in the North American P-51, Republic P-47, etc.

One of the most promising new forms of air inlet is the submerged type as used on the new Ryan XFR-4, a recent study of which revealed that by diverging the walls of the ramp as the submerged entrance was approached, appreciable recovery of pressure could be obtained.[8] The boundary layer flows around an "eyebrow" and a "lip" collects the air for the duct system.

Best duct design practice indicates a gradual expansion of high entrance velocity air to prevent excessive losses[6] and elimination of irregularities in the entrance region, which easily upset flow. The transition from laminar to turbulent flow occurs at a critical Reynolds number[12], which varies according to the value of the disturbance in the inlet.[19]

Transition of the boundary layer may be avoided by using low angles of divergence in the duct walls.[14] Round ducts, which avoid sharp elbows and accelerate the flow have shown the lowest losses. A duct inlet of uniform height, to prevent separation, and a vane located slightly aft of the inlet to drain off the boundary layer—as in the Lockheed P-80 air intakes—have proved efficient in tests.

▶ **Cutting Duct Losses**—Losses are frequently created by high velocities, abrupt changes of shape or cross-section,[7] butterfly valves or duct leakage, which may be avoided by a duct sealing band. Duct couplings should be designed to accommodate turbojet engine expansion.[5] Recent tests reveal that an air shutoff system should be provided multijet bombers because the windmilling drag of a "dead" engine can result in a drag of 15% of the maximum net thrust at 500 mph. and 25% at 650 mph.[8] Screens have been recommended to prevent entrance of foreign matter and an internal inertia separator to avoid turbojet engine icing or power losses created by rain or snow.[15] Ducts may be constructed of plywood[16] or plastics[17] of sufficient strength with the size and shape constituting the major fabrication design problems.

The duct outlet velocity should approximate the free stream and care should be taken to avoid extended regions of high velocity near the outlet, according to recent research.[3] A series of tests points to the cusped tail outlet as used on the Republic P-48 as the most efficient, and care should be exercised in its location due to the effects of jet spreading and waving during maneuvers.[18]

NORTH AMERICAN XFJ-1 takes advantage of ram effect by having flow straight through from nose intake to exhaust beneath empennage.

▶ **Supersonic Internal Flow**—In order to use supersonic air for combustion purposes it must first be slowed to subsonic speed, the process of which also provides compression on which the operation of the supersonic ramjet and turbojet engines depend. This process creates a shock wave, which may either be handled outside or inside the supersonic inlet.

The interior shock diffuser consists of a converging nose inlet, which slows the supersonic air to the speed of sound, and a diverging duct, which slows the air to subsonic speed.[19] Tests have indicated that this type with circular open nose shapes may have efficiencies comparable to good, low-speed diffusers.[8] This type diffuser must attain a high Mach number before starting (as is the case with the Navy Bumblebee ramjet missile) but its compression efficiency is about 85% (comparable to an I-40 compressor) and its exterior drag is quite low.

The exterior shock diffuser employs a pointed conical central body and an annular intake and has produced efficiencies of more than 90% at Mach number 1.85.[8]

▶ **Future Progress**—Subsonic internal flow systems demand careful attention to detail design of component parts and future design will place greater emphasis on extensive wind tunnel tests and mathematical analysis prior to construction of experimental aircraft. Higher output turbojet engines (such as the Menasco) will demand greater quantities of air and greater heat dissipation than heretofore.

High speed subsonic aircraft design will require increasing attention to the location of air inlets in nose and wing to reduce external drag, particularly over a wider range of speeds and angles than accommodated heretofore. The demand for thinner fuselages and wings will bring internal airflow technology into sharper focus with increased efficiencies mandatory.

Compression to be obtained by supersonic air inlets renders the supersonic ramjet engine one of the most attractive single mechanical elements in the aviation field today. Its success, however, will depend proportionately on the extent and fruitfulness of present research efforts now gaining momentum.

A more rigorous theory is greatly needed, and this is being attacked by a handful of physicists uniquely qualified for the work. This can be followed by extensive practical experiment which may well produce supersonic jet aircraft and missiles comparable in efficiency and economy with the familiar reciprocating engine.

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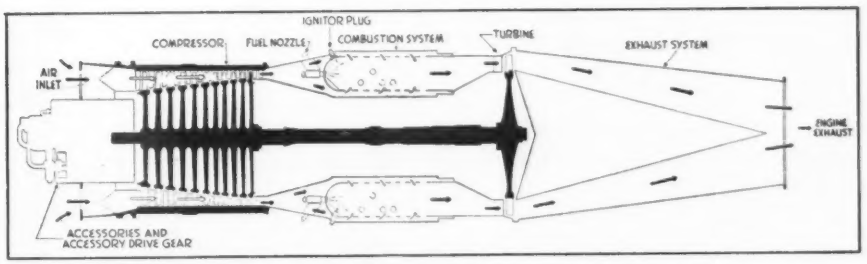
Design Analysis: General Electric TG-180 Turbojet

Here we investigate the vital installations which complement the major sections of this turbojet—accessories and drive; lubrication, fuel, ignition, and starter systems; engine mounting; and pilot's controls . . .Concluding this first engineering study.

By NEIL BURGESS

Aircraft Gas Turbine Engineering Div., General Electric Co.

With the advance in turbojet engineering, much progress has been made in the refinement of accessories arrangement and exterior placement of piping and other component parts. This general design progress is notable in the TG-180, which constitutes a remarkably clean installation.



Schematic Flow Diagram of GE TG-180 Turbojet

► **Accessories and Drive**—Accessory drive gear casing is mounted at the front of the unit and is bolted to the forward frame. Forward face of the gear casing has mounting pads and drives for engine and aircraft accessories, which are normally covered by a streamlined nose fairing. Piping, wiring, and the shaft for engine speed control are brought radially outward, through the fairing and airstream, within four streamlined "islands" having fittings for connections to be made by the aircraft manufacturer. The air inlet screen protects the compressor from pebbles or any objects which might accidentally be left in the inlet duct.

The non-rotating accessories, mounted in the accessory compartment or on the outside of unit, include: Flow divider, ignition transformers, air filters, drip valve, thermal units, and oil filters.

► **Lubrication System**—Lubrication system is a combination of solid oil jet lubrication for the engine forward end, including the accessory drive, and air-oil mist lubrication for the aft three bearings.

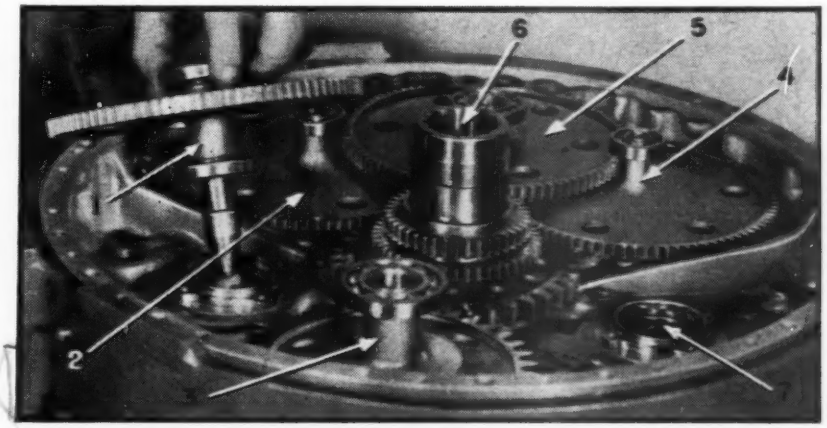
Oil is taken from the engine supply tank to the engine lubricator—a multi-plunger piston type pump, each piston having an oil displacement of approximately one quart per hour. Output of each piston supplies a separate jet, several of which are used to spray oil onto the front main bearing and accessory drive gears. Oil drained from the bearings and gears into the gear case is scavenged with a separate pump element and returned to the tank. One jet also supplies oil to each of the three main rear bearings in the aft frame between compressor and turbine. Air extracted through filters from the compressor fourth stage is also blown onto these three rear bearings for cooling and oil atomization. The air-oil mixture is drained overboard through a connection in the aft frame.

Oil is supplied to a separate pump element in the fuel pump, to supply lubrication for the latter, also hydraulic pressure for operation of the main fuel regulator. A small quantity of oil is lost through leakage in the fuel pump and the regulator, the remainder being returned to the tank.

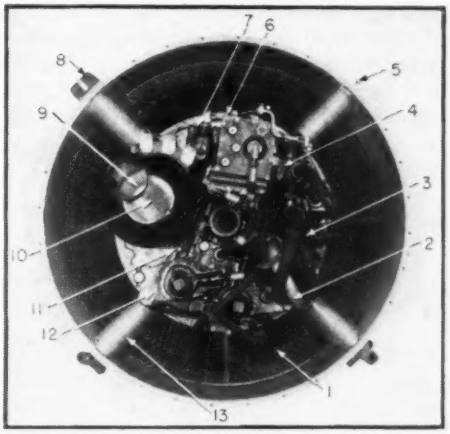
Total lubricating oil consumption, including the oil drained overboard, is approximately nine pounds per hour. No oil cooler is required, since the major part of heat rejected to the oil is carried overboard in the air-oil drain.

► **Fuel and Control System**—Reduced to bare fundamentals, control of a turbojet merely requires the adjustment of the main fuel flow, injected through spray nozzles into the combustion chamber, thus controlling engine speed, and, consequently, the engine output thrust. Use of a simple throttle valve in the fuel line is not a practical control, however, because continual and extensive throttle readjustment would be required to maintain the engine speed at a desired value over wide ranges of atmospheric pressure and temperature and airplane speed to which the engine is subjected.

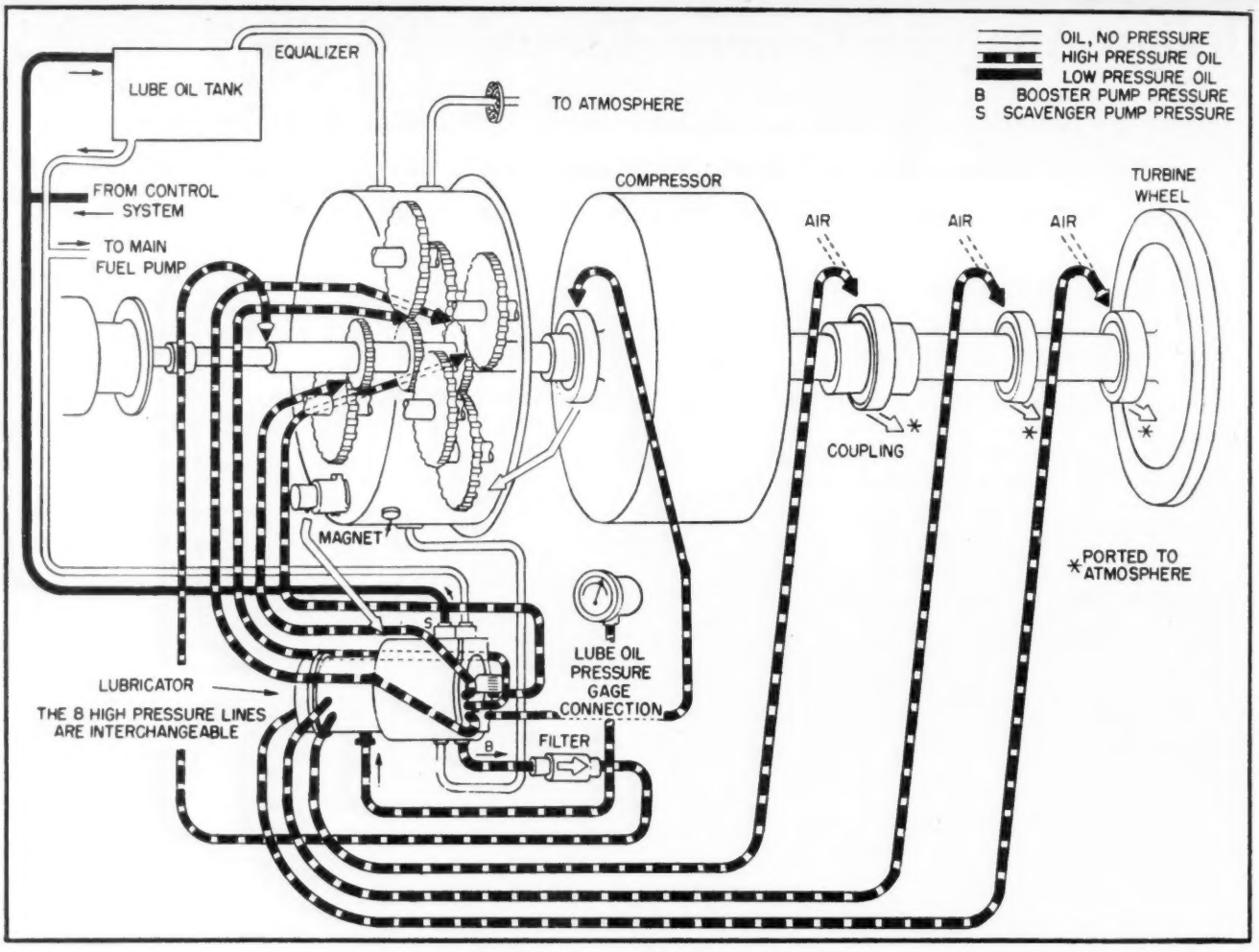
Required variation in engine fuel flow for the TG-180 is obtained with a variable-displacement multi-cylinder piston-type fuel



Rear of accessory gear case, cover removed. Gears are: (1) Hydraulic pump, (2) lubrication pump, (3) starter-generator, (4) tachometer generator, and (5) fuel pump. At (6) is seen spline to front of compressor rotor (full engine speed) and at (7) fuel control regulator gear bearing (gear removed).



Front view of TG-180, showing accessory arrangement: (1) Air inlet screen, (2) fuel inlet connection, (3) fuel pump, (4) high pressure stop cock, (5) engine control shaft, (6) fuel control regulator, (7) engine governor, (8) terminal box for starter-generator leads, (9) starter-generator cooling air inlet, (10) starter-generator, (11) hydraulic pump pad cover, (12) oil filter assembly, and (13) accessory piping "island."



Schematic Diagram of Lubrication System

pump. Variation of the pump displacement, and, consequently, fuel delivered to the burner nozzles, is achieved by a hydraulic plunger moving a wobble plate in the pump, varying the stroke of the pistons. Hydraulic pressure (variable control oil) is obtained from the fuel regulator, designed so as to maintain constant engine speed over the full range of aircraft operating conditions for each setting of pilot's control lever. Components of the fuel regulator are: (1) Shaft for engine control by pilot. Initial few degrees rotation opens the high pressure stopcock or fuel shut-off valve and permits low speed engine operation. Further rotation of shaft increases the engine speed by adjusting the mechanical setting of the governor; (2) mechanical engine-driven governor incorporated in the fuel regulator, to maintain constant the engine speed called for by pilot. This device varies hydraulic pressure delivered by the fuel regulator, and, consequently, the flow delivered by the fuel pump. Governor has positive adjustable stop at upper end of the speed range to protect the engine against rotating speeds higher than design speed; and (3) thermal units in the engine exhaust system which take over control from the governor and reduce the engine speed when exhaust temperatures exceed 1,300 deg. F., thus protecting the engine from excessive temperatures. These thermal units are not operative except under extreme flight conditions.

The fuel nozzles are of the duplex type, consisting of a small nozzle in each burner for low speed and for high altitude operations when low fuel flows are required; and a large nozzle operating in parallel when high fuel flows are required, automatically brought into play by a pressure-operated valve, or flow divider. Fuel used is ANF34 (aviation kerosene) or ANF28 (high octane gasoline).

► **Ignition and Starter Systems**—In starting a turbojet, it is necessary to increase the speed mechanically to such value that airflow is available for ignition of fuel and combustion. In general, at this low speed, and, consequently, low compressor discharge pressure, the turbine and compressor efficiencies are quite low. Hence, even after combustion has begun, it is necessary to use the starting motor to assist in accelerating the unit idling speed. When the engine speed, and, consequently, compressor discharge pressure, have increased sufficiently, the turbine and compressor efficiencies become high enough for the engine to operate satisfactorily without assistance from the starting motor, which may then be disengaged.

Components used for starting are:

(1) Starter-Generator. This is a direct-coupled 24v. d.c. unit running at approximately engine speed. As a starter, it has a rating of about 12 hp. for short-time. Under engine operating conditions it is a 400-amp. 24v. d.c. generator used for aircraft electrical power.

(2) Ignition coils and ignitor plugs. The two ignition coils are 400-c. transformers normally operated from the aircraft's a.c. power supply and producing approximately 20,000v. The ignitor plugs, placed in two of the eight combustion chambers, are similar in design to standard aircraft sparkplugs except that they have large spark gaps (about 0.100 in.) for positive operation. Ignition in the other six chambers is obtained by flame travel through the cross-ignition tubes.

Starting procedure is to energize the starting and ignition circuits, accelerating the engine to approximately 600 to 800 rpm. (firing speed). Upon reaching this speed, the speed-control-shaft is advanced somewhat, opening the high pressure stopcock and allowing the fuel to spray into the combustion chambers, with almost instantaneous ignition. Engine speed is increased by further advancing the speed-control-shaft. At approximately 1,500 rpm. the engine has become self-sustaining, the starter load has become negligible, and the

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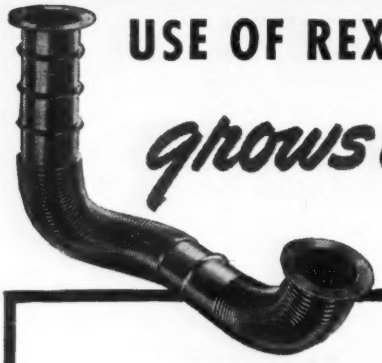

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3. Magneto and generator blast tubes	✓	✓	✓	✓	✓		
4. Internal combustion heater exhaust connections	✓	✓	✓	✓	✓		
5. Fire extinguisher flexible metal connections	✓	✓	✓	✓	✓	✓	✓
6. Cross ignition tubes						✓	✓
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starter, through a reverse-current relay, begins operating as a generator to supply d.c. power. No warmup is necessary, and the engine may be immediately accelerated to full thrust. Total time required to reach takeoff thrust from the moment the starter circuit is energized is approximately 75 sec. Ignition is required only during the few seconds needed to ignite the fuel; the circuit is then normally de-energized, although it is completely radio-shielded if operation is necessary without interference with the radio and radar operation.

Because of ram pressure effect of forward speed, an engine which is not operating will windmill at a substantial speed when the craft is traveling at high velocity. This makes it possible to start a turbojet at altitude by energizing the ignition circuit and advancing the speed control lever, without energizing the starter. Successful air starts have thus been made at high altitudes.

To provide a continuous indication to pilot that the lubrication system is operating satisfactorily, the principal bearings are equipped with thermocouples and connected to the cockpit indicators. Thermocouples are installed in the exhaust system for cockpit indication of gas temperature.

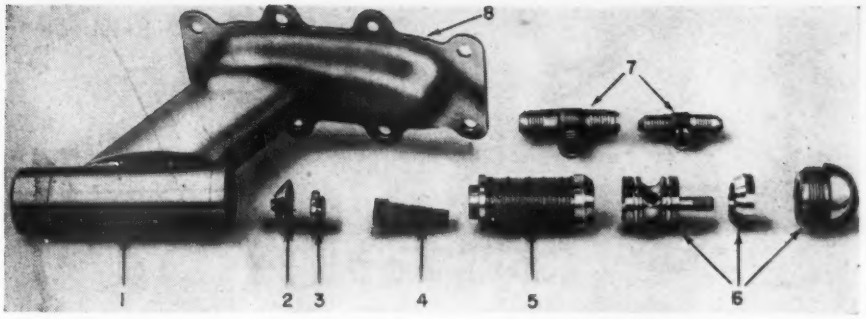
▶ **Engine Mounting**—Requirements for mounting a turbojet are to obtain sufficient strength to carry the design loads, and to provide sufficient flexibility to compensate for deflection of the aircraft and the engine structure because of flight stresses and thermal expansion.

Provisions are made on the TG-180 for several mounting arrangements, the most common consisting of a three point mounting whereby the engine is supported by two main horizontal trunnions on the midframe, one of which permits radial movement to compensate for frame thermal expansion. The two trunnions are arranged to permit up-and-down rotation of the engine about the trunnion axis. Third support is a drag link incorporating a ball joint at either end and usually located at the top trunnion on the forward frame. This arrangement prevents up-and-down rotation of the engine about the trunnion axis but permits axial expansion of the unit.

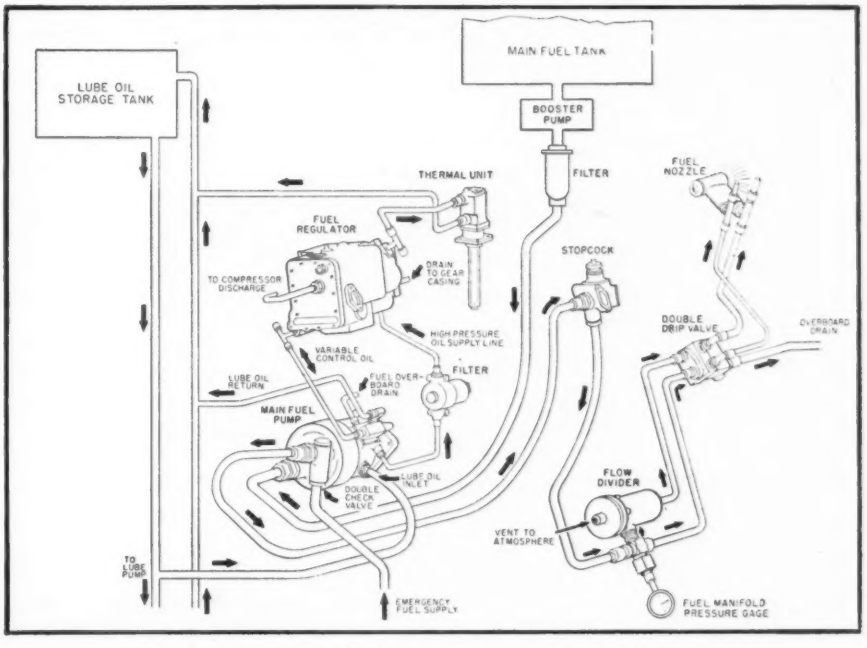
Design load factor of TG-180 is 8G's, with permissible ultimate of 12G's, without failure. This load has been simulated for certain critical assemblies by a factory test of the complete engine while operating at full thrust.

Fundamental Data
GE TG-180

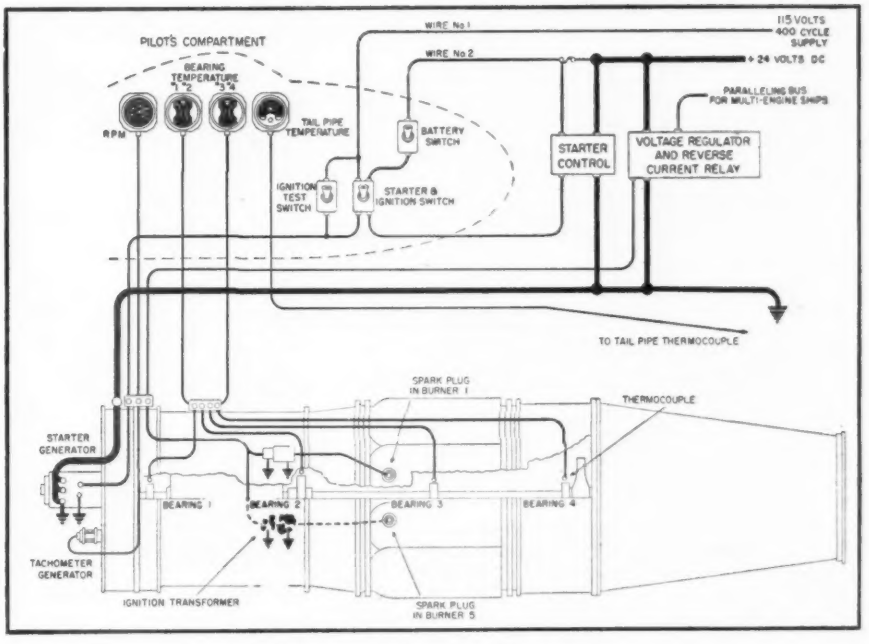
Maximum dia.—36¾ in.
Maximum length—166 in.
Weight (including all accessories)—2,380 lb. (av.); 2,450 lb. (guaranteed max.)
Thrust (15 min. takeoff and military rating)—4,125 lb. (av.); 3,750 lb. (guaranteed min.)
Rpm. (takeoff and military)—7,700
Exhaust gas temp.—1,250 deg. F. (max.)
Thrust (max. continuous rating)—3,420 lb. (av.)
Sfc. (lb./hr./lb. thrust)—1.026 (av. cruise)
Fuel—Gasoline (ANF28) or Kerosene (ANF34)
Lubricant—3606 hydraulic fluid or 1065 engine oil



Details of fuel nozzle: (1) nozzle body, (2) metering orifice large slots (sea level and high speed), (3) small slots (altitude and idling), (4) porous bronze filter for small slots, (5) wire screen filter for large slots, (6) nozzle assembling parts, (7) fuel inlet connections on cover plate, and (8) cover plate.



Schematic Chart of Fuel and Control Oil Line



Electrical System Diagram

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HOW PERMANENTE METALS—IN A SINGLE YEAR—HAS BECOME A KEY FACTOR IN AMERICAN INDUSTRY—PRODUCING 175 MILLION POUNDS OF KAISER ALUMINUM!

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After careful planning and organization, The Permanente Metals Corporation—led by Henry J. Kaiser and associates—started to carve out a permanent place in the aluminum world.

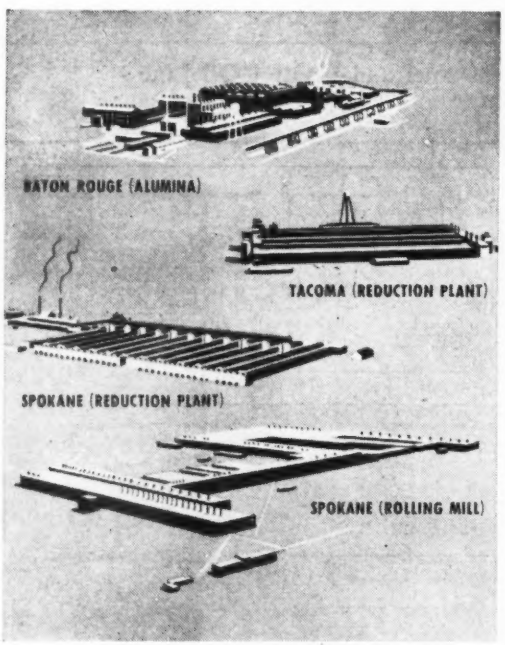
The first objective: To produce aluminum in tremendous volume and thus offset the shortage which was then crippling the production of finished products.

That this objective was achieved . . . and surpassed . . . is revealed by one statistic—175 million pounds of plate, sheet, and strip aluminum in the first year. Almost as much as the entire industry produced in the most productive year before the war!

The pictures and text on these pages *partially* reveal how this was done.

What they cannot hope to portray is how administrative vision, technical skill, and a completely coordinated operation combined to make such production possible.

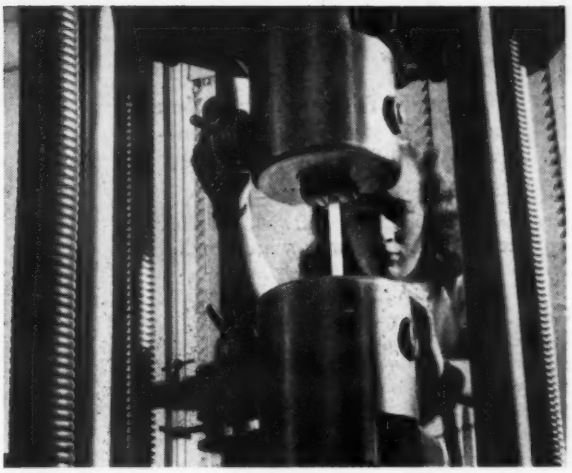
This same combination is now achieving Permanente Metals' second objective—to make Kaiser Aluminum, already second to none, the finest in the land!



1. From bauxite processing to finished product—This chart gives a step-by-step picture of Permanente Metals' aluminum operation . . . which controls the production of quality aluminum from its huge bauxite processing plant at Baton Rouge, Louisiana . . . through its mammoth reduction and finishing plants at Spokane and Tacoma, Washington. Such integration assures fast, reliable service.

2. Preparing the "pig"—Operating eight modern pot lines, Permanente's reduction plants at Spokane and Tacoma, Washington, can turn out over 700,000 pounds of pure pig aluminum daily. This pig aluminum is then sent to the rolling mill, also in Spokane, where it is converted into alloyed ingots and then rolled into plate, sheet and strip.

3. Down the "hot line"—Permanente Metals' 53-acre Spokane rolling mill is one of the largest, most modern plants of its kind in the world. An example of its up-to-the-minute equipment is the "hot line," the giant rolls which convert alloyed aluminum ingots into sheet. This rolling mill is capable of producing 288 million pounds of Kaiser Aluminum a year.



4. Quality first—With production reaching new peaks, Permanente Metals is now concentrating on producing the highest quality aluminum ever offered to manufacturers. Constant chemical and physical tests plus infinite care in handling assure that customer requirements are not only met, but exceeded.

5. Ready to go—Here is the result of just one day's rolling mill production of Kaiser Aluminum. Ready to ship, it will go into aircraft, buses, building materials, house trailers, appliances, garage doors, kitchen utensils . . . will be welcomed by scores of America's leading manufacturers who rely on Permanente Metals for quality aluminum, fast, dependable deliveries, and an eagerness to be of service!

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Monowheel Gear In Volmer VJ-21

Prospects favor unorthodox landing device improved during year of flight tests.

Contrary to a prior announcement, Volmer Jensen's Volmer VJ-21 two-place plane will retain its unique monowheel landing gear.

In forming Volmer-Carssow Airplane Corp. of Los Angeles to promote development of an all-metal production model of the prototype, officers of the company stated that the plane would be redesigned for a tricycle landing gear. At that time it was believed a conventional landing gear would be mandatory; that personal aircraft buyers would never accept the monowheel design.

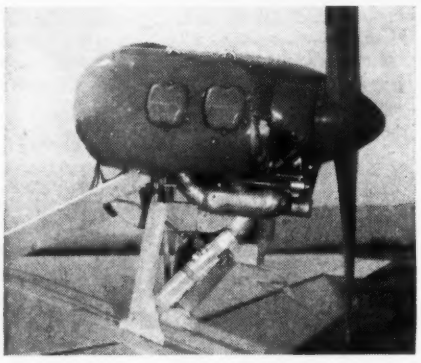
Now, however, officers say that potential buyers have expressed themselves so positively that the original landing gear concept has been readopted in projection of the commercial plane now being financed.

While it is impossible to say at this time that Jensen's design, a development of the single-wheel landing gear that is "conventional" for some models of gliders and soaring planes, will be a trend marker in personal aircraft production, it nevertheless justifies careful consideration.

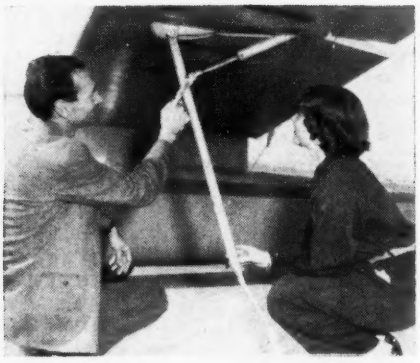
▶ **Theories Demonstrated**—During the year that the experimental VJ-21 has been in flight, several of Jensen's theories favoring the monowheel design have gained practical demonstration:

- The low CG. of the plane and single main wheel contact with the ground have facilitated "pasture" and rough ground landing and taxiing that would not be practical with light aircraft equipped with conventional gear;
- Ability to lower one wing and maintain substantial aileron control up to the termination of landing roll has enabled pilots of the VJ-21 to make successful crosswind landings that normally would be indicated only for aircraft equipped with castering landing wheels;
- Taxiing is unusually flexible through ability of the plane to turn on its main wheel through 360 deg. by use of propeller blast on the rudder with the wheel brake locked. Normally, however, to avoid excessive wear on the tire, Jensen executes a tight taxi turn by moderate application of the brake and allowing the wheel to track a circle of approximately 3 ft. (Accompanying photographs show clearly the placement of the wheel, carried in a central fuselage well directly behind the cabin and somewhat ahead of the centers of gravity and lift.);
- Because the plane has a ground clearance of only a few inches it can be allowed to pitch forward on its glider-type nose skid to effect an abnormally short roll in an "emergency" landing.
- **Steerable Tailwheel**—Technically, while this landing wheel performs the bulk of work, the Jensen arrangement probably should be called a "quadrawheel" gear, for a small steerable taxiing wheel is carried beneath the empennage, and spring-loaded retractible arms attached to the wing of the point of separation of flaps and ailerons carry small wheels supporting the wind during taxiing.

Volmer VJ-21, Incorporating Latest Changes.



Closeups shows simple mount for Continental C-75 engine. Builders say mount has strength factor considerably in excess of CAA requirements.



Wing wheel of VJ-21 extended for landing and taxiing. Hydraulic cylinder retracts gear along under side of wing between flap and aileron.

As an ultimate precaution against wing damage, should the wing wheels fail to release or the pilot neglect to lower them before or after landing contact, tips of the VJ-21 are fitted with light-weight aluminum scuff caps.

Plans for the proposed commercial model call for integration of wing wheel release latch, now actuated by a cockpit lever, with the main wheel brake so that the wing wheels will lower automatically the moment brake pressure is applied. Retraction of wing wheels is by manual hydraulic pump.

▶ **Strong Engine Mount**—Mounting of the VJ-21 power plant is simple and rugged, the builder claiming a strength factor considerably in excess of CAA requirements. Thrust line is such that the aircraft has shown no tendency to nose down or climb in power on and off applications.

Production model wings will be built of Dural, having a modified NACA 2418 foil at the root and 4812 at tip. Fuselage and empennage will also be of Dural construction. Standard equipment will include: airspeed indicator; altimeter; compass, starter; battery; oil temperature and pressure gages; fuel pressure gage; Delco Remy starter and generator; Sensenich propeller; Reading battery; and two-way Ranger radio.

Production model specifications:

Span	38 ft.
Length	23 ft.
Height	7 ft. 6 in.
Wing area (inc. ailerons)	145 sq. ft.
Aileron area	9 sq. ft.
Gross wt.	1,200 lb.
Empty wt.	800 lb.
Useful load (inc. 16 gal. gas and 1 gal oil)	500 lb.
Wing loading	9 lb./sq. ft.
High speed	118 mph.
Cruising speed	100 mph.
Stalling speed (without flaps)	50 mpm.
Stalling speed (with flaps)	45 mph.
Climb at sealevel	750 fpm.
Service ceiling	15,000 ft.
Max. range	300 mi.

New Schweizer Sailplane

Described as the first U. S.-built sailplane in the "super-performance" class, the all-metal Schweizer Model 121 is scheduled to make its first appearance in competition at the National Soaring Contest, now in progress and continuing until July 20, at Wichita Falls, Texas. The first of several 121's to be built, owned by Richard J. Comey, of Cambridge, Mass., manager of the Soaring Society of America, was to be flown in the Wichita Falls competition in attempts to better the international glider distance record of 465 miles, now held by Russia. The 121 has a 51 ft. wingspan, an exceptionally thin wing, and has shown cruising speed as high as 90 mph. in initial test flights at Schweizer Aircraft Corp.'s plant at Elmira, N. Y. It carries water ballast in wing tanks which can be jettisoned.

See for yourself how Truarc slashes assembly time, cuts costs

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Right before your eyes is visual proof of how much assembly time can be cut. Each of the many light streaks in the first photo traces another time-taking arm motion, increasing fatigue and reducing efficiency. In the second photo, one Waldes Truarc Retaining Ring replaces six screws and a collar. The assembler uses one tool—a pair of Truarc pliers. The single light streak means one arm-motion. Less time is required for job-training, because Truarc guarantees accurate relationship of parts regardless of the skill of the assembler. Truarc means lighter weight, less bulk. Production and maintenance men find Truarc Rings cut labor and material costs wherever they're used. Their unique taper design assures constant circularity. Their never-failing grip does a better job of holding machine parts together.

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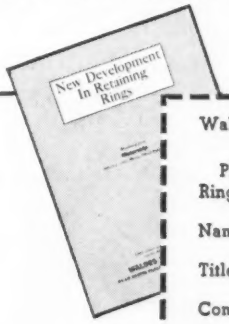

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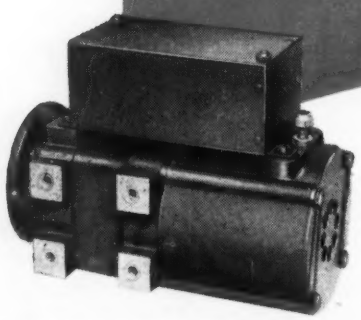
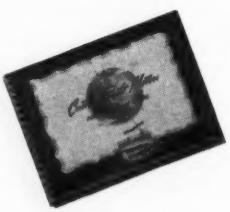
H_2O for the J-33 in the P-80-B

A Problem this EEMCO Motor Helped Solve



EEMCO D-289 water injector motor, showing mounting bosses cast integrally with frame. Castings are of heat-treated aluminum, with Rosan inserts used. Motor, 27 volt DC; output speed, 3750 RPM; 3-minute duty cycle.

Water injection in the J-33 turbo-jet engine in the P-80-B "Shooting Star" increases take-off and climb performance materially. Achievement of these advantages demanded a water injector motor with a lot of power, but in a small package. Lockheed put it up to EEMCO. The result was a 4.15 hp. *explosion-proof* motor with integral gear box, weighing only 15 pounds. A radio noise filter completes the unit. Here is a typical example of outstanding results when tough problems in custom-built motor design and development are put up to EEMCO.



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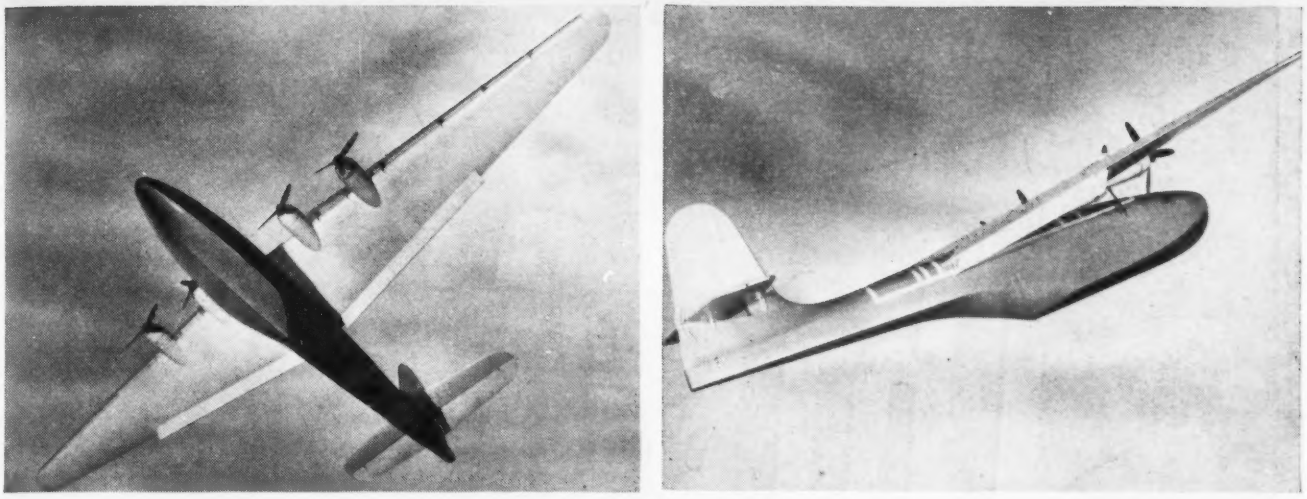

PLANING TAIL HULL

Exclusive pictures of new planing tail hull developed by NACA at Langley Field hydrodynamic tunnels. Model at left shows V-shaped planing surface at tail and steep, well-faired single step. Model at right shows small hull area (in white) that rests in water affording up to 50% drag reductions over conventional hulls. Leading edge slots are not representative of full scale design but are used to achieve properly-scaled wing lift effects of full size flying boat.

Baumann Brigadier Makes First Flight

Baumann Aircraft Corp. "Brigadier" twin engine personal cabin plane and light transport made its first test flights at Metropolitan Airport, Van Nuys, Cal., last week.

J. B. Baumann, designer and president of the company, reported good control and flight characteristics throughout the initial flight and in a subsequent test flight two days later the only difficulty experienced was in oil cooling, expected to be corrected through louvres now installed to direct air flow around crank cases of the plane's two 125 hp. Continental engines.

▶ **Cruising Speed 150 mph**—The plane is designed for a cruising speed of 150 mph and in first flights, with gear down and propellers turning at 2,150 rpm as contrasted with designed cruising of 2,350 rpm, the Brigadier showed an indicated speed of 125 mph. Pilot on the test flight was B. F. Baumann, cousin of the designer, who said that no unusual control characteristics resulted from the pusher mounting of propellers at the wing trailing edges.

Distinctive structural feature of the plane is its mounting of the propeller bearing boxes on Lord mounts giving the effect of floating rubber suspension of drive shafts.

▶ **Near Accident**—A near accident accompanied the first test flight when the pilot obtained emergency clearance to land with oil overheating and came in down wind and into the approaching landing of a P-51 national guard fighter. Baumann gave the Brigadier full power and hedge hopped over the Mustang, landing successfully after another circuit of the field. The plane's oil cooling problem was not unexpected in that the engines are not equipped with oil coolers. The designer is confident that installation of oil coolers will not be necessary.

Beman Will Leave Lockheed Staff

Ward W. Beman, Lockheed Aircraft Corp.'s chief aeronautical research engineer, will resign within the coming month. Lockheed, undergoing a far-reaching reduction of its engineering staff, is understood to have "accepted" a resignation handed in by Beman last January.

Beman, who in nine years with Lockheed gained national recognition as an aeronautical research authority, told AVIATION WEEK that he will make improvements in technique the foundation of a business he intends to launch shortly with William Bell, and which will be identified as "Telecomputing Engineering Company".

PRESIDENT TRUMAN'S NEW AIR OFFICE

First photo of exterior of "The Independence," Douglas DC-6 which will be used by chief executive, shows special marking comprising American eagle design—light brown beak on nose, blue head, and blue feathers and stripe.

This Sign...
AT MORE THAN A THOUSAND LEADING AIRPORTS, ALL OVER THE UNITED STATES, SAYS "LAND HERE FOR ALL YOUR FLYING NEEDS"
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New Service Offered Foreign Equipment Buyers

New concepts of "red carpet" treatment for foreign purchasers were revealed last week by Pacific Airmotive Corp. at Burbank, Calif., as part of its expansion program in the increasingly-important export field.

When a foreign government or airline representative advises PAC of his arrival, he is immediately assigned the service of an export department representative whose sole duty is to assist the customer from arrival to departure. When the visitor arrives he finds hotel and transportation accommodations made; if an interpreter is needed, one is available. He is told on arrival that Pacific Airmotive stands ready to arrange a single credit; that if PAC is unable to completely fill his needs from its own inventory it will arrange purchases from other dealers and include charges under a single letter of credit, so the customer gains the added advantage of having all purchases shipped through a single customs office from one place.

On a tour of sales rooms, shops and engineering offices the visitor finds specialists ready to advise on problems peculiar to his buying needs, even to the extent of laying out a complete overhaul base. In planning rooms he finds ready for use scale models of all tools and equipment normally required for an airline operation, and engineers ready to present a visual display of the best method of installing American-made maintenance equipment in the space indicated by the buyer.

Final step in the program is arranging, if necessary, for training natives in PAC shops. The industrial relations department will work out with the visitor complete training courses, will assign instructors and, in most cases, arrange for housing foreign personnel who may be sent to this country. To further strengthen permanent ties, the visitor learns he can purchase PAC-manufactured overhaul and repair tools, such as propellor governor test benches, magneto test equipment, propeller blade straighteners, hydraulic test units, etc.

Stan Wilson, service sales manager, told AVIATION WEEK he believes it inevitable that extension of world markets will dictate, as in the case of his own company, revision of export selling methods. "No longer can we be content with only our domestic markets," he declared, "nor can we simply open up showcases and hope foreign buyers will find what they want. If we are to maintain the manufacturing supremacy of the United States aviation industry, we must be prepared not only to show what we have to sell but to demonstrate how it can be used in helping the buyer improve his airline operation economically. Today our customers come to us from halfway around the world in three days and tell us they have to put an airline in operation in three months. Only by a form of intensive and personalized service such as we are now using can we hope to satisfy such customers and be reasonably sure that in years to come they will return with repeat orders for American products."

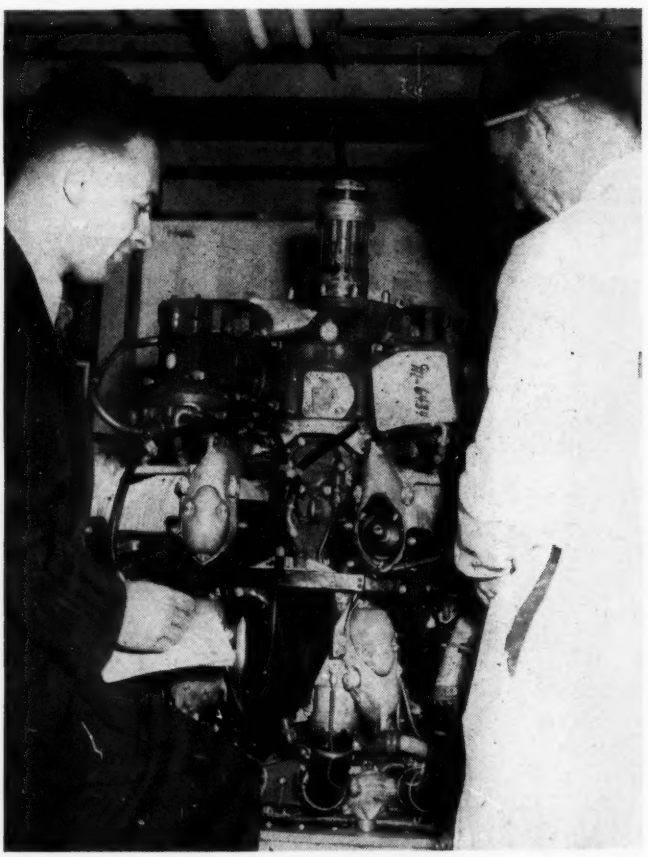
Navy Orders Radar

Navy will install a new lightweight (150 lb.) airborne navigation radar in all four-engine NATS transport aircraft. A production order for 100 sets (APS-42) goes to Houston Corp., Los Angeles.

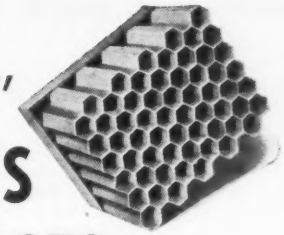
The new radar will have a scanner mounted on the plane nose for 220 degree coverage of terrain ahead or under the fuselage for a 360 degree coverage. Five inch cathode ray tube scopes will be mounted in both pilot and co-pilot's positions. A special 12 in. scope will be mounted in the radio operator's compartment for use in long over water navigation.

Using this set it is possible to detect land masses up to 100 miles away. Radar beacons now being installed on both coasts and a transcontinental route are visible in the airborne scope up to 225 miles away.

STAN WILSON (LEFT), PACIFIC Airmotive Corp. service sales manager, demonstrates carburetor flow test bench to Raymond Cano, superintendent of maintenance for Aerovias Reforma, Mexican airline, as part of PAC's "red carpet" service for foreign buyers.



AL THUOTTE (LEFT), OF PACIFIC Airmotive serves as guide, instructor and interpreter for Roger Poirier (right) during latter's training on American aircraft in Burbank, Calif. At end of training period provided by PAC, Poirier will head Air France mainte-

A Honeycomb "Sandwich"  *helps*

4800 DRAFT HORSES BECOME *RACE* HORSES

Convair 240's find favor fast. Already more than 160 have been ordered by domestic and foreign airlines. It is the first commercial transport to use auxiliary jet exhaust thrust for added speed. Other features include air-conditioning; heated wings, to prevent icing; pressurized cabin and reversible pitch props. Honeycomb is used throughout for flooring and shelving.

Consolidated Vultee's new Convair 240 was designed for speed. Two 2400 h.p. engines carry 40 passengers at a cruising speed of 300 m.p.h.

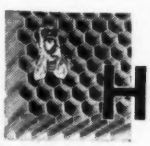
With that passenger load, engineers were naturally dead-weight conscious. One way they saved many important pounds was through the use of Weldwood* and Armorply Honeycomb.

This new structural "sandwich" is extremely light. The core weighs less than 4 pounds per cubic foot, and the strength/weight ratio of the finished "sandwich" is amazingly high.

Honeycomb core can be made from many materials . . . impregnated cloth, paper, Fiberglas or others . . . depending on requirements. Facings can be decorative or utilitarian, too . . . fine decorative veneers, aluminum, stainless steel or plastic.

Armorply and Weldwood Honeycomb is available in stock sheets, contoured panels or other semi-finished forms to meet your specifications. Get full engineering data on this remarkable material. Write today.

*T.M. Reg. U.S.P.C.



WELDWOOD and ARMORPLY HONEYCOMB *made by* **UNITED STATES PLYWOOD CORPORATION**
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Flight Instruction System Commences National Campaign

Californian is recruiting 400 schools and 400 sales personnel to begin $225 course promotion

By SCHOLER BANGS

Can 2,500,000 new aviation students be found, nationally, within the next 12 months and each sold a $225 flight course?

After studying promotional ideas since V-J Day in 1945, a Los Angeles flight school planner believes he has discovered the way to do it, and has set up the organization to attempt it.

He is Robert Pike, who has incorporated National Flight System, Inc. and this month is launching a national campaign to establish 400 NFS dealers to sell the system flight course and accredit as many, or more, already-established flight schools as flight instruction centers for NFS students.

Pike lost money in fathering his original program, Pacific Pilots, Inc., regained it with organization of a new California Company, Pacific Pilots Plan, Inc., and now, profiting from previous mistakes, feels that success is assured.

Here's how it works:

A broker is assigned in a given territory to canvass potential "distributors," who will sell the system to prospective flight students for established flying schools whose owners signify interest in acquiring an NFS franchise.

When a distributor has been selected the NFS representative effects a meeting with heads of the franchised flying schools (not more than one operator is franchised on any one airport) to work out details of the schools reception of students signed up by the distributor and his sales forces.

Once the student has been sold his course the school operator completes the contract, providing the student with a "packaged" offering of eight hours of instruction, 26 manual lessons in navigation, meterology, theory of flight, engines, and personal aircraft maintenance, low club rates for aircraft rental after the student has learned to fly, certain cross country flight privileges, discounts on airplane purchases, advanced technical training if desired, and an offering of post-graduate home study courses and employment service.

As was the case in the Pacific Pilots, Inc. organization, the National Flight System offers as a basic inducement to the flying school operator assurance that all of his student sales efforts are taken off his shoulders and placed in the hands of the NFS distributor.

ROBERT PIKE

NFS goes farther in providing the accredited operator with complete school courses, attractively printed and carefully prepared, and all printed school forms necessary for conduct of his business.

Similarly, NFS provides distributors with all of their office "paper work" needs, sales, accounting, and office supply manuals and kits, and an advertising manual, plus specialized advertising post cards and streetcar card posters.

In short, National Flight Systems acts as an instrument for setting up distributors and flight operators in business, provides the pattern for a painstakingly-developed student aviation course, and subsequently supervises the inter-relationship of its distributors and operators.

"Essentially the parent organization is a service and coordinating company and our profits come from royalties received from volume business generated by the 'packaged' flight course we have developed," Pike explains.

His estimate of being able to establish 400 distributors in business within twelve months is based upon the success, since activation last summer, of Pacific Pilots Plan, Inc., now an NFS distributor in California, and on aviation and general market surveys.

Results of the past year in California confirm estimates of a national potential of approximately 2,500,000 students.

What percentage of such a potential NFS can expect to generate, and capture, the NFS president can't estimate.

But, he does say this:

"We know from experience that a carefully established distributor will have no less than 20 sales a month, while a big distributor, in an area of high density population, will show from 200 to 300 sales per month. This indicates that in twelve months we will be showing an annual sales average ranging from 96,000 to 1,440,000 students."

Pike, who has established headquarters at Gardena Airport, near Los Angeles, is assisted by Bob Gunnell, director of field service, and Miller Dunckel, director of distributors' appointments.

He believes that in two years of ups and downs of experimental flight plan development in California he has rid his present plan of the business "bugs" that brought failure to his original company.

"Originally we went to finance companies for support of our contract paper, a serious mistake. Rates were exorbitantly high, and we wound up with freezing of all accounts receivable and a $20,000 deficit when we reorganized as Pacific Pilots Plan, Inc. last July, and established bank connections under which contracts were turned over to the bank for collection immediately upon writing," Pike recalled.

"Also, we originally tried to own our own planes, as was described in AVIATION NEWS in 1945. This was a mistake and WE lost heavily on it. We learned that we could not successfully divide our attention between administration duties and those of a flight operator.

"We discovered by trial and error types of advertising that were wasted effort, and those that pay handsomely. For example, when we placed between 800 and 1000 advertising cards in Los Angeles streetcars carrying the words "Learn to fly—only $15 a month" and a cartoon of a cow with forelegs outstretched and floating through the air as a passing robin exclaimed 'It's her third lesson with Pacific Pilots Plan' we got from 25 to 50 replies a month. But when we attached to the car card two stapled pockets containing cartoon embellished business reply cards, postage prepaid, our inquiries soared to 1000 a month and sales accordingly."

In the past two years a variety of prices for the flight course "package" were tested before the present $225 price was established as one assuring reasonable profits and being acceptable to students as well.

As tested in California, the plan has produced a ratio of 40 percent women and 60 percent male students, whereas the national average is 1 to 17 percent women.

Aeronca Offers Plan For Flying Clubs

Four plans for starting flying clubs for group ownership of training airplanes are provided in a new illustrated booklet distributed by Aeronca Aircraft Corp., Middletown, Ohio, entitled "How to Form an Aeronca Flying Club."

Basic down payment figures for purchase of a plane by a club of 20 persons, who finance the plane on the standard one-third down, 12 months balance at 6 percent interest arrangement, range from $40 per person for a $2,400 plane, to $50 per person for a $3,000 plane. In addition, each person would pay monthly dues of from $9.16 to $11.19 for the remiander of the airplane's cost.

▶ **$2 Per Hour**—This would make it possible for each participant to have use of the plane at $2 per flying hour for gas, oil and maintenance. The booklet allots $1.25 an hour for gas and oil and the remainder for maintenance and, in most cases, a major overhaul after 500 hrs. of operation, the plan states.

A second plan calls for outright purchase of the plane by a 10-member club with initial payment by each member of from $240 to $300 for his share in a $2,400 to $3,000 plane. With this arrangement, monthly payments would cover only insurance and hangar rent at from $4.05 to $4.56 a month per person and the same $2 an hour for flight time.

▶ **Industrial Club**—A third plan for a 20-member industrial club suggests that the employer may be willing to finance the plane on a 12-month non-interest bearing loan which the employes could pay off at monthly installments of $12.02 to $14.78, depending on the airplane price.

Most economical of the suggested plans from the standpoint of the club member is a fourth proposal which would provide for the employing company to buy the plane as an employe recreation facility and resell it for $1 to the 20-member employe flying club. Such an arrangement would provide for monthly dues of $4.02 to $4.78 depending on airplane price, and the $2 an hour operating fee.

All four plans assume that hangar rent is $20 a month, that insurance is purchased at $10.25 a hundred, and that services of a competent instructor can be obtained for from $2.50 to $3 an hour. The last plan takes into account depreciation of the plane at 20 percent a year, while the other plans do not consider this factor.

CAP Radios

Wisconsin's Civil Air Patrol Wing has received 60 two-way radios from War Assets Administration for use in a statewide wave network for emergency or disaster use. Stations will be established in 45 communities, some will operate two sets.

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NO. 18 IN THE SERIES, FEATURING PROMINENT ESSO AIRPORT OPERATORS

ANOTHER AVIATION EXPERT PREFERS Esso

"because I like to have things right..."

says J. Wayde Stewart
owner of Stewart Airport Company
Parkersburg, West Virginia

"Because I like to have things right, I am an ESSO Aviation Dealer.

"I know that I can sell ESSO Aviation Products with confidence that the quality is right and that it will always remain that way. I know the ESSO dependability because I have known ESSO Products for years.

"ESSO Aviation Dealer service is right, too. And that is also important. Because of it, I can give my customers attention that will keep them coming back for more. To a great extent the future of private flying is going to depend upon smooth servicing of private planes.

"These things together with the enormous and well earned customer acceptance of the ESSO name are the reasons for my choice of ESSO."

Signed: J. WAYDE STEWART

J. WAYDE STEWART got his start in aviation in 1923. Although too young to accept a commission, he attended Officers' Training School at Chanute Field in Illinois. In 1932 he started private flying and in 1936 bought the Parkersburg Municipal Airport.

Mr. Stewart has been Treasurer of First Region, National Aviation Trades Association; conducted Civilian Pilot Training programs before the war and War Service Training programs during the war with one of the largest schools in the country. He is also distributor for ERCOUPE in West Virginia—Kentucky—Ohio and dealer for North American "Navion."

J. Wayde Stewart, knowing aviation from the ground shops to the planes in the air, prefers Esso Aviation Products . . . because he likes things RIGHT . . . and knows he gets *right service* backed by *right quality* and *right aviation research* with ESSO AVIATION PRODUCTS!

Failure to Detect Stalls Found Pilot Problem

Inability of experienced pilots to recognize approaching stalls is a far more serious factor in aircraft accidents than has been heretofore appreciated, according to preliminary evidence already collected in a continuing flight research program involving use of the recently perfected safe flight stall warning indicator.

Findings in the program thus far, conducted under National Research Council sponsorship, indicate that few private pilots tested thus far can detect the stall, while even licensed commercial pilots and instructors are far from infallible.

▶ **Professors Report**—Prof. R. J. Hulon of Harvard University and Prof. Floyd Dockerey of Ohio State University reported to the recent Washington meeting of the Committee on Selection and Training of Aircraft Pilots, a unit of NRC, that their flight research, using an Aeronca Champion at Harvard and a Piper Cub J-3 trainer at OSU, showed very similar results, indicating:

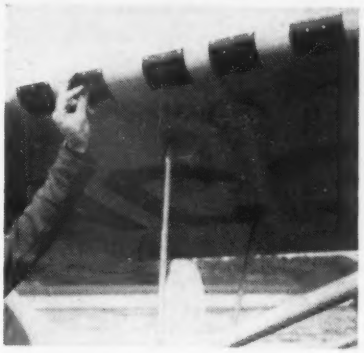
- The average student or private pilot with 15 hr. or more past solo does not recognize a stall.
- Many instructors do not know stalls, and therefore are unable to identify them to students.
- Some pilots, in all grades, approach a stall condition in their normal flying.

The tests are being conducted with five of the stall warning indicator wing installations on one wing, set for progressive actuation. Each wing indicator is wired to a light on a panel in the check pilot's cockpit. As the plane approaches the stall the indicators light the panel in series. After all five lights flash on, the plane actually stalls.

▶ **Pilot Errors**—One pilot, making his final turn on landing approach, lighted four of the five lights at a point where recovery was almost impossible if he had actually stalled. And some pilots showed more lights, while flying normally, than when the check pilot told them to put the plane into stalling condition deliberately.

Further flight research will seek to determine how stalls may be identified in instruction and what effect the use of an unfamiliar airplane has on the pilot's stall perception. It is planned to use a Taylorcraft Army surplus L-2 liaison plane for pilots who have been flying the Cub and the Champion, since it has different stall characteristics from either plane.

Dr. Hugh Dehaven of Crash Injury Research Unit, Cornell Medical College, New York City, suggested at the meeting that investigation was needed on other probable factors in stall accidents, pilot panic when a stall is indicated at low altitude, and pilot inattention to cockpit instruments such as might occur when he is checking a navigation point.



FIVE STALL WARNINGS

All phases of an aircraft stall, from the time it is approached until the stall is fully developed are indicated by these five stall-warning indicators, put on an Aeronca at Westchester County Airport, New York, as a part of a research program for CAA. Educational Research Corp., of Cambridge, Mass., which is conducting the program using several planes so equipped at various airports, seeks to determine how accurately the average student, private and commercial pilot can determine when a stall is about to happen. Indicators are products of Safe Flight Instrument Corp., White Plains, N. Y., and are arranged to light lights on a check pilot's grading board, as the pilot progresses through various stages of a stall.

NATA Heads Plan Recruiting Tour

President Beverly Howard and Executive Director Harry Meixell of National Aviation Trades Association will make an air tour within the next few weeks to visit state operators associations which have not yet affiliated with their organization, it was announced after a recent meeting of the NATA Board of Delegates.

Howard and Meixell will visit operators in Ohio, Minnesota, Kansas, Kentucky, Wisconsin, Mississippi and Tennessee in an effort to point out advantages of joining the national Federation of state operators associations along with the 30 states which now have member associations. Representatives from 23 of the 30 member states attended the recent delegates meeting in Washington.

Proposal for coordinating some Washington services of NATA and Aeronautical Training Society, including circularization of a common Washington newsletter to both memberships, was sanctioned at the NATA meeting, and was passed on to an ATS committee for action by the large flight school operators. If approved, the newsletter it is understood, will be edited by Wayne Weishaar, secretary-treasurer of ATS.

Tennessee Sponsors Maintenance Clinic

A one-day course for training aviation mechanics and maintenance men in newest methods and equipment for engine and aircraft maintenance and repair is being opened by the Tennessee Bureau of Aeronautics at 10 a.m. July 15 at Tri-City Airport, Johnson City. At the same time on successive days, the course will be conducted at other airports in the state on the following schedule: July 17, Knoxville Municipal Airport; July 22, Lovell Field, Chattanooga; July 24 and 25, Berry Field, Nashville; July 28, McKellar Field, Jackson; July 29, Tom Stewart Field, Union City, and Aug. 1, Memphis Flying Service, Memphis.

Following manufacturers of aircraft, engines and accessories have indicated they will send factory representatives to explain their service and repair methods: Continental Motors, Aircooled Motors, Aeromatic Propellers, Aeronca, Piper, Bellanca, Stinson, North American Aviation, Beech, Cessna and Luscombe.

The one-day "refresher" course has been scheduled in an effort to insure more efficient maintenance at Tennessee airports, with a view to decreasing accidents as well as lowering operation costs on Tennessee airplanes.

Charles Ragland, chairman of the State Aeronautics Bureau, said the course would fill-out the Bureau's multi-sided program of aviation training which began when it pioneered in the civilian pilot training program, training of women pilots, promotion of flight training for high school students, and flight training for state police officers. He predicted that other states would follow Tennessee's lead in conducting similar courses for mechanics and maintenance men with help of factory representatives.

Esso Co-pilot

A directory of all airports which market ESSO (Standard Oil Co. of New Jersey) aviation products, is being distributed free by the ESSO Aviation Division, Sales Department, R. C. Oertel, manager, has announced. Titled, "The ESSO Co-pilot", the booklet also contains detailed information as to the fields listed, their services, air mileage charts, traffic signal code, weather symbols and terminology, and Civil Air Regulations.

Radio Distributors

Three New York State aviation companies have been named distributors for General Electric Company's personal plane radios, and other aviation electronic equipment as it becomes available. The distributors: A. R. O'Donnell Co., Roosevelt Field, New York; O'Connor Aircraft, Albany Airport, Watervliet, and Buffalo Aeronautical Corp., Buffalo Municipal Airport.

Device Uses Radio To Light Airport

CAA studying invention to control field illumination by pilot in flight.

A device making it possible for a pilot to turn on the lights of an unattended field by pushing a button in his plane has been developed by a Texas radio engineer and is being studied by CAA. CAA approval of the system could carry with it re-designation of a field so equipped as a mechanically-attended field available for use after dark.

Inventor is Vernon L. Mallory, Mineral Wells, Tex., who, in 1937, made a night landing at an unattended field. Two years later he had completed his first working model which was tested successfully for three months at Stinson Field, San Antonio. Mallory obtained a patent on the development in 1943 and recently has resumed promotion of his system after being discharged from the army.

▶ **Little Additional Equipment**—Only additional equipment necessary in an airplane would be a small box about four inches square and weighing about 20 ounces, tied in with the ordinary transmitter. Any regular radio frequency can be used. When the button in the plane is pushed, it transmits a tone to receivers on the ground which convert it to an impulse that operates switches turning on the lights. Transmission on this tone does not interfere with other use of the radio, such as communication, or range reception.

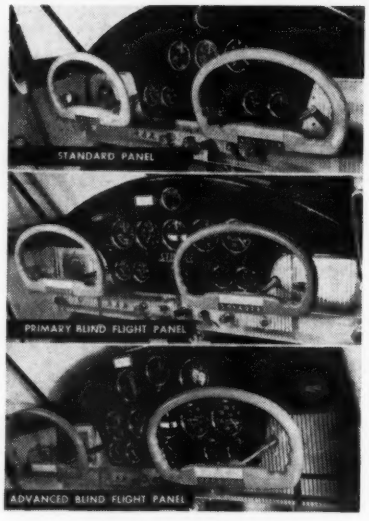
Modification of the transmitter in the plane could be made for from $5 to $10 by any qualified radio mechanic with technical details furnished by Mallory. With his main interest in production of the ground equipment, Mallory says that if the system found widespread use he would endeavor to persuade radio manufacturers to incorporate the necessary components in their plane transmitters.

▶ **For Unattended Airports**—Main market for the Mallory system would be small airports which are unattended at night. Until some determination of the potential market has been made, Mallory is reluctant to estimate a price for the airport equipment, although it is likely it would be under $1,000. One of the major assets of the equipment is that in addition to operating the field lights, it would give the airport a radio receiver usable for ordinary reception with the addition of a speaker.

The system requires two receivers on the ground, the second one being employed to make it impossible for static to turn on the lights. The system is connected to both boundary and runway lights. Pressing the button the first time lights up the boundary lights. A second impulse turns on the runway lights. A switch is connected to the wind sock or wind tee so that the runway lighted will be the proper one. If the wind indicator is not already lighted, the Mallory system would incorporate a light for this which would also be turned on to indicate the wind direction. In case of wind moving between the runways, the system would light both runways, indicating that a cross-wind landing is necessary.

▶ **Automatic Cutoff**—The system is equipped with an automatic cut-off. The lights remain on for a set period of from anywhere from three minutes to an hour.

Mallory has already demonstrated his latest model to a CAA regional lighting conference in Fort Worth, and has been discussing applications of the system with CAA officials in Washington. He has a tentative agreement with an airline to test the equipment in one of their planes with an airport in Texas suitably equipped. The airline is interested in the device as an emergency safety feature. Mallory looks upon his invention as being primarily useful for private flyers.



THREE VOYAGER PANELS

Choice of three instrument panels standard, primary flight group or advanced gyroscopic panel is being made available as factory installations on Stinson Voyagers and Flying Station Wagons. The new panel installation plan is designed to save customers time and money and provide neater and more efficient installations for pilots desiring additional equipment. All panels have two-way radio. Standard panel has compass, airspeed indicator, altimeter, time-recording tachometer, oil pressure and temperature gauges, fuel gauge and ammeter. Primary panel substitutes sensitive altimeter for standard instrument and adds clock, turn-and-bank indicator, and rate-of-climb. Advanced panel adds directional and attitude gyros, and direction indicator replaces compass. All three panels have rheostat-controlled backlighting.

Subnormal Eyesight Seen No Bar to Flying

Thirty percent of a student pilot group with sub-standard eyesight scored flight training grades above the average of a comparable group with normal eyesight in recent flight research tests at Ohio State University.

Dr. M. S. Viteles, Chairman of the National Research Council's Committee on Selection and Training of Aircraft Pilots, reported on the tests, conducted with a group of 194 young men over a three year period. He disclosed at a Washington meeting that 38 percent of the students with vision below standard CAA requirements were "washed out" in training, while 17 percent of the normal vision students were failed.

Flight experience reports of the students since completion of the course has shown no significant differences between the two groups in spite of the vision differential. Most of the flyers report occasional "tough moments" in approaches and landings, although no accidents have been reported.

The Viteles report was in addition to previous data on the Ohio State visual acuity flight tests disclosed several weeks ago.

Findings of the data are likely to result in revision or liberalization of present visual acuity medical requirements for CAA private pilot licenses.

Republic Cuts Orders to Equalize Inventories

Republic Aviation Corp. has curtailed some orders with suppliers to bring inventories into line with revised production schedules, company spokesmen told AVIATION WEEK.

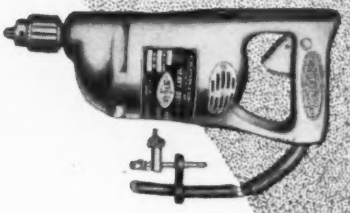
They emphatically denied that the Seabee program had been abandoned, stating that the parts order reductions had undoubtedly given rise to widespread rumors to that effect. As further evidence that the company was not getting out of the personal plane field they cited the recent appointment of Dan M. Parker, Jr. as director of personal plane sales.

Dusters Display

A three-day program on advanced techniques for aerial "bombardment" of insects, plant bacteria and other crop pests will be conducted at Stillwater, Okla. North Municipal Airport, Aug. 7-9 in conjunction with the second annual convention of the National Flying Farmers' Association at the Oklahoma Agricultural and Mechanical College, Stillwater.

Experienced commercial operators will give flight demonstrations of aerial dusting and spraying with insecticides, fungicides, weed-killers, and aerial distribution of seed and fertilizers. Planes and equipment used will be available for inspection.

Sioux Tools

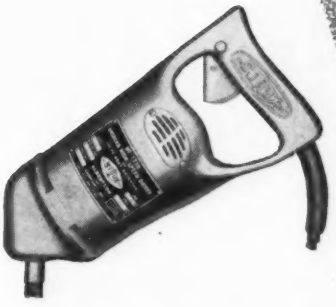


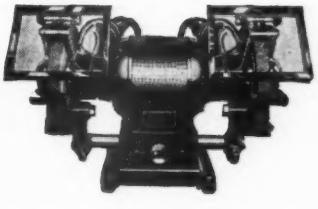
Sioux Portable Electric Tools

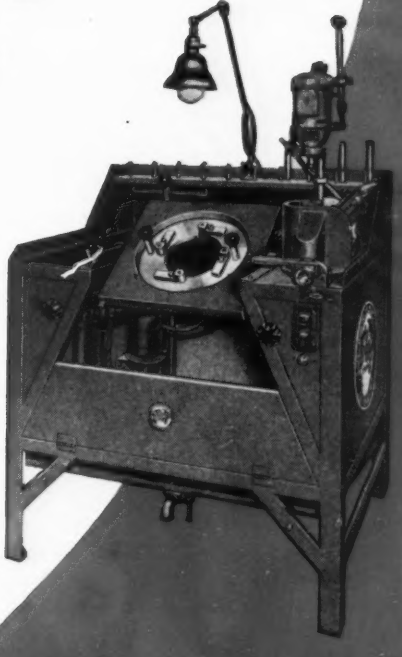
Drills - Grinders - Sanders
Valve Grinding Machines
Valve Seat Grinders
Bench Grinders
Flexible Shafts

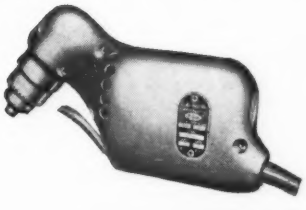
Sioux quality and performance gives the most efficient and economical method of handling any job.

SOLD ONLY THROUGH AUTHORIZED SIOUX DISTRIBUTORS









STANDARD THE WORLD OVER

ALBERTSON & CO., INC. SIOUX CITY, IOWA, U. S. A.

WHY
take a chance...

● More than 35,000 lives have been saved with Irvin Type Air Chutes. Now Irving offers the sensationally new Custom-Built *Chair* Chute . . . a chute that makes flying decidely safer . . . a chute with these important features:

1 SIMPLICITY...You don't need special training to use the Irvin *Chair* Chute.

2 CONVENIENCE . . . You don't have to carry the *Chair* Chute around or store it . . . it's always in your plane . . . in the back of the chair...ready for instant use.

3 COMFORT...You don't have to "wear" the *Chair* Chute . . . either in or out of your plane . . . except in an emergency.

4 SAFETY . . . The *Chair* Chute can be buckled on in a jiffy in an emergency... and you are ready for any eventuality.

Custom-Built *Chair* Chutes are available . . . now . . . for every type of cabin plane . . . large or small. Many well-known companies and individuals are installing these new *Chair* Chutes in their planes . . . for added protection in flight. Write for circular and full particulars about this new kind of protection for the plane you own or plan to buy.

There are now over 35,000 registered members of the Caterpillar Club. Should you qualify, please write us.

FEEL SAFER...BE SAFER... with IRVIN Custom-Built CHAIR Chutes

Illustrations show Irvin Custom-Built *Chair* Chutes installed in Beechcraft, Stinson, and Ercoupe planes. The chairs have the same beauty and comfort as deluxe airplane seats . . . plus the "built-in" safety of an Irvin Chute. *Chair* Chutes do not take up extra space . . . cost little . . . are easily installed. Get them for your plane.

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The Life Preserver of the Air

IRVING AIR CHUTE CO., INC.

1671 JEFFERSON AVENUE, BUFFALO 8, NEW YORK

Pacific Coast Branch: 1500 Flower St., Glendale 1, Calif.

BRIEFING FOR DEALERS AND DISTRIBUTORS

FLYING & FISHING—Other flight school operators who include seaplane training in their course of study can take a tip from Dade Aviation, Tamiami Airport, Fla., which is mixing fishing with its multi-engine seaplane training in a Grumman Widgeon. Ed Turner, co-owner of the flight school, takes the student out for some practice approaches, landings, takeoffs, and single-engine procedure, then stops the plane in the middle of Lake Okechobee to fish a while. "The fishing period helps the student relax and prepare for more training later in the day," Turner says. Some students prefer swimming to fishing and they can do that, also. How time is logged wasn't made clear.

PRIVATE FLYING TO MEXICO—San Diego County Airport Owners' and Operators' Association is sponsoring private plane flights to Mexico each weekend this month, with inspection service available at Lindbergh Field, San Diego, from 10 AM to 6 PM Sunday. A charge of $60 is required by government regulation for Sunday inspection. The operators' group has guaranteed payment of this fee each Sunday, but individual pilots will pay a customs and immigration fee of only $3. The international flights were arranged to prove to government the need for a full-time customs inspection service at Lindbergh Field.

VJ-21 LIAISON APPLICATION—The VJ-21 lightplane, with single main wheel recessed in bottom of fuselage glider-fashion, was demonstrated to Wright Field officials recently at Dayton Municipal Airport, by Jean Reimer, former Wasp, while John Carssow, president of the Volmer-Carssow Aircraft Co., Los Angeles, was talking to Dayton Chamber of Commerce officials about possibility of locating a plant in Dayton, if AAF likes the plane for observation-liaison purposes. Production version will be all-metal, although demonstration prototype has fabric and plywood covering.

START FLYING NOW—Airplane dealers and operators who haven't received announcement of the Continental Motors Corp. "Start Flying Now" campaign will miss a chance at a good tie-in with a national promotional campaign, unless they write to Continental's Advertising Service Dept., 415 Association of Commerce Bldg., Grand Rapids, Mich. The engine manufacturers is distributing free mats for a series of advertisements in local newspapers, appealing to the public which has a hankering to learn to fly, but hasn't done anything about it—yet. Specimen slogans in the advertising series: "You've always been interested in flying, why not start now? You'll wonder why you put it off so long;" "Have you been up lately?" "It used to take all day—now you're home by noon;" "A personal plane is a useful farm machine." The mats contain blank spaces for insertion of the local dealer's name, location and airplanes handled. Continental emphasizes that the operator need not handle Continental-powered planes in order to obtain the free mats. Each ad contains a coupon, which readers are asked to send to the local dealer, indicating interest in learning to fly. The dealer's part consists in buying local newspaper space and a following up inquiries resulting from his local ads. "We believe," a Continental spokesman explains, "that selling methods that work in other fields can be applied successfully to sale of flying lessons and rental and sale of planes. They may be even more effective because up to now in this industry they have not been very widely used."

ONE-THIRD EX-GI'S—Survey conducted by Lockheed Aircraft Service, Inc., at its two American bases at Burbank, Cal., and MacArthur Airport, Sayville, L. I., shows that of 1,233 employes checked, more than a third are veterans of World War II, and in many cases the jobs now held by the veterans closely parallel their occupations while in the service. Both bases have contracts for work on army and navy transport planes, and domestic and foreign operators of two and four-engine planes.

RE-FINANCING FOR ROCKET?—Reports from Ft. Worth say the Johnson Rocket, which has been dis-associated from the Johnson family for some time, may go back into production with some new financing, but that it will not have any connection with the Texas Engineering & Manufacturing Co. at Dallas.

RUNWAY DEDICATION—Los Angeles County is inviting local airport owners to "dedicate" their runways for public use, as a means of combatting rising airport tax charges. Rezoning of airports in the county as industrial areas, subject to industrial zone tax rates, is blamed for a decrease in the number of landing areas from 57 airports in 1929 to only 28 at present. County officials have offered to apply for use of state aviation gasoline tax money to maintain any such runways that may be dedicated to the public. It was reported that Grand Central Airport in Glendale, with an assessed valuation of $975,000, has a tax bill this year averaging more than $5,000 a month, while Lockheed Air Terminal will be paying $4,000 a month taxes on runways with assessed valuation of $700,000.

Alexander McSurely

Solar Parts Orders Up

Solar Aircraft Co., San Diego, has received orders for over 2,300 stainless steel C-54 exhaust manifolds; manifold parts for the Consolidated Vultee PB4-2; and sheet metal components for jet engines. Total of the new business is over $700,000.

Just drop this card in the mail with your name and address and find out how easy and inexpensive it is to win your wings through National Flight System. Plenty of new planes on airports everywhere!

WHY WAIT—THE POSTAGE IS PAID!

Name..... Age.....

Telephone No.....

Street .....

City..... Zone.....

MAIL THIS CARD TODAY

REPLY CARDS

Using business reply postcards like this one attached to streetcar ads in Los Angeles, Pacific Pilots Plan managed to get 1,000 mailed inquiries a month, from which much flight instruction business was developed. Similar promotion will be used in various localities as National Flight System gets into operation.

New Airport Construction

Proposed Work

Camp Campbell, Ky.—RUNWAYS—U. S. Eng., Bldg. T-7, Gravelly Point, Va., rein.-con. runways. $2,500,000.

Cleveland, Ohio—LABORATORY—Nat. Adv. Comm. for Aero, Municipal Airport, heat testing laboratory. $1,750,000.

Huron, S. D. — AIRPORT IMPRVS. — City, voted bonds, municipal airport imprvs. $570,000.

Camp Hood, Tex.—RUNWAYS—War Dpt., Bldg. T-7, Gravelly Point, Va., rein.-con. runways. $2,750,000.

Galveston, Tex.—ADMIN. BLDG.—Herbert Y. Cartwright, mayor, plans by Charles H. Zwiener, 310 Cotton Excxhange Bldg., brick administration bldg., concrete fdn. $155,000.

Bandera, Wash.—LANDING STRIP—State Aero Comn., 905 Second Ave. Bldg., Seattle, emergency landing strip. $105,700. R. L. Nuber, c/o owner, engr. CAA. Bids this year.

Lester, Wash.—AIRPORT—State Aero Comn., 905 Second Ave. Bldg., Seattle, airport. $118,000. R. L. Nuber, proj. engr. Bids this year.

Low Bidders

Alton, Ill.—AIRPORT IMPRVS.—Ill. Dpt. Aero, 503 S. 7th St., Springfield, concrete apron, grading, drainage, sodding, seeding, clearing, etc., Alton Civic Memorial Airport, from Madison Constr. Co., Box 222, Edwardsville. $371,304. N. C. Baird, Springfield, ch. engr.

Champaign, Ill.—AIRPORT LIGHTING SYS.—Univ. of Ill., Champaign, lighting sys. at U. of I. Airport, State Proj. PWA 16 (1) (L) from Champaign Asphalt Co., 1302 N. Oak St. $65,641.

Chicago, Ill.—TAXIWAYS—City, Dpt. P. Wks., City Hall, concrete airplane taxiways, bituminous surface course, Chicago Municipal Airport, from American Asphalt Paving Co., E. 97 and S. Torrence Sts. $247,950.

Andrews Field, Md.—HANGAR—U. S. Eng., 1st and Douglas Sts., Wash., D. C., Butler type hangar, from Baltimore Contractors, 711 S. Central Ave., Baltimore. $198,609.

Industry's Lowest Freight Rates Offered in Slick Airways Tariff

San Antonio operator undercuts certificated competitors by more than 7 cents a ton mile; Low level of charges seen as blow to other independents.

By CHARLES ADAMS

Undercutting the proposed new rates of its certificated competitors by more than 7 cents a ton mile, Slick airways, the nation's largest airfreight carrier, has published the lowest cargo tariff ever filed with CAB.

The San Antonio operator's disclosure that it will offer an average rate of 12¾ cents a ton mile effective Aug. 1 may prove more of a blow to other independents than to the 19 or 20 certificated carriers which last week were slated to file a consolidated tariff at a 20 cents a ton mile level. Some uncertificated airfreighters had hoped that Slick would join them in submitting to CAB a uniform tariff calling for a 14½ or 15 cents a ton mile average rate.

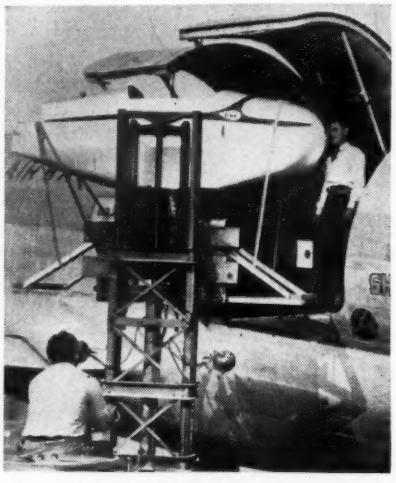
▶ **No Further Drop**—Few observers look for either another drop in the certificated airlines' freight rates to meet Slick's level or an attempt by most of the other independents to match the low rate. Cargo officials of several certificated carriers believe Slick cannot make money at 12¾ cents a ton mile with C-46E equipment.

Any effort by the certificated airlines to push their freight rates below the proposed 20 cents level probably would be met by a renewed cry from the independents that mail payments are being used to subsidize cargo. As the independents see it, the scheduled domestic airlines have failed to make money while getting the equivalent of 50 cents a ton mile for passengers and anywhere from 45 cents a ton mile (Eastern, United, TWA and American) to over $15 a ton mile (Northeast) for mail.

▶ **Slick Criticized**—This being the case, the independents profess to regard even the 20 cents a ton mile cargo rates of the certificated passenger-carrying operators as "out of line" with other charges.

As a contract carrier, Slick has been criticized bitterly by other independent airfreighters for holding cargo rates down to "uneconomic levels." Some quarters believe the rates proposed by Slick for its common carrier operations, together with the lower changes contemplated by the certificated lines, mark the beginning of the end for small independents using C-47s.

▶ **Former Rates Given**—While the certificated carriers' proposed Aug. 1 tariff represents a reduction of about 25 percent from their current 26.5 cents a ton mile level, Slick's new rates show little change from those in effect during the past six months. Slick's average cargo income after reaching a low of 11 cents a ton mile last fall has been 13 cents a ton mile since February.



Slick Loads a Link Trainer

Under its new tariff, Slick's charges are only 15 to 25 percent higher than those for rail express. Its highest rates are still 66 percent below air express, which moves at an average of 61.4 cents a ton mile.

▶ **CAB Action Sought**—Slick filed its tariff in anticipation of early CAB action on its request for common carrier rights under Section 292.5 of the Board's Economic Regulations. This section makes active airfreighters eligible for common carrier privileges until CAB decides on route applications submitted before last May 5.

By the beginning of last week, CAB had not issued a letter of registration under 292.5 to any all-cargo line. With the recent addition of Flamingo Air Service, Avon Park, Fla., and Air Cargo Transport Corp., N. J., the group of applicants under 292.5 has grown to 13.

▶ **Railway Express Move**—Meanwhile, Railway Express Agency is trying to have its exemption broadened to permit shipment of its air express over all-cargo lines qualified to operate as common carriers under 292.5.

Important features of the new Slick tariff:

• **Regular service** to nine "principal points"—Los Angeles, San Francisco, Dallas, San Antonio, Chicago, Detroit, Newark, New York and Philadelphia. (Regular service has been suspended temporarily at two other principal points—Houston and St. Louis.) In addition, Slick plans to serve 152 "demand points" whenever these places have shipments aggregating 1,000 lb. or more.

• **Regular rates** range from about 18.3 cents a ton mile for small shipments to 11.5 cents a ton mile for large loads, compared with a 33 cents to 14 cents range for the scheduled airlines.

• **A "deferred freight"** category under which shipments can be made for less than 9 cents a ton mile. Deferred freight is described as shipments accepted by the carrier for transportation at its convenience. Deferred rates are 70 percent of the regular rates on shipments up to 10,000 lb. Competitors assert Slick will "break its back" on the ultra-low deferred rates.

• **Tariff table setup,** which provides for successively lower rates at 100 lb., 1,000 lb., 3,000 lb. and 10,000 lb. volumes, will encourage freight forwarders and consolidators to ship via Slick. The certificated airlines' tariff will not have sufficient volume break points suited to forwarder operations.

• **Premium commodity rates** ranging up to 180 percent of the regular are charged on cattle, baby chicks, uncrated furniture, garments on racks, extra heavy pieces weighing over 2,000 lb., corpses, etc.

• **Pickup and delivery rates** of 50 cents a hundred lb. and $1 minimum are the same as those proposed by the scheduled airlines at the larger cities.

Expensive Reading

Participants in CAB's freight forwarder case who want to buy a complete transcript of the hearing which has been underway for nearly five months will have to dig deeply.

By July 4, transcript of the hearing—longest in board history—totaled 8,193 pages. At 30 cents a page, interested parties could purchase the record for $2,457.90.

The proceedings started in New York Feb. 17, shifted to Washington March 24, to Chicago April 14, Oakland, Cal., May 12, and back to Washington June 16. One hundred and eighty witnesses had appeared before Examiner J. Earl Cox by the beginning of last week. End of the hearing within another ten days is predicted.

A noteworthy advance in the lubrication of aircraft engines—big and small

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To AIRLINE OPERATOR and small-plane owner alike —Shell Research now brings an oil that promises to establish new criteria for engine efficiency and engine maintenance cost.

It took years of testing and literally dozens of "combinations" to arrive at new, compounded AeroShell Oil D. Finally one combination—a blend of new fortifying agents with the finest of aviation-grade base stocks—proved what was wanted:

Greatly reduced deposits of lacquer and carbon throughout the engine. Virtual elimination of flaky lacquer deposits on oil screens. Reduced oil consumption, because of less deposits in oil ring grooves and drain holes. Improved mechanical condition of piston rings, and longer service from exhaust valve guides. Better protection from corrosion during engine shutdown.

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"With the Koppers Aeromatic propeller, the Piper Super Cruiser is one of the best seaplanes I have ever flown!"

So declares Henry Kent, former Pan American Airways pilot and now in charge of aircraft sales for Wiggins Airways in New England. His testimonial is typical of the high regard in which the Super Cruiser seaplane, equipped with Edo Model 2000 floats and the Koppers Aeromatic propeller, is held by operators and private owners throughout the country.

The Aeromatic automatic variable pitch propeller installation has been fully ATC'd for the Super Cruiser floatplane. Properly adjusted and operated, it can cut take-off run and time by as much as 35 per cent and can increase rate of climb by as much as 20 per cent, besides adding appreciably to cruising speed. Under normal operating conditions, the Aeromatic-equipped Super Cruiser at full seaplane gross weight, can clear a 50-foot obstacle in approximately 3800 feet.

Lightplane owners have long been aware of the three-place Super Cruiser's versatility . . . its adaptability to any kind of pleasure or commercial operation. Now, with the Edo floats-Aeromatic propeller combination giving it such satisfactory performance, it will win even greater popularity. Call your Piper dealer for details today!

For optimum performance from the Super Cruiser floatplane with Aeromatic installation, it is important to have a correctly adjusted propeller. The same model F-200 propeller, with blades model 74 E, for the land plane is used but with additional counterweights. The engine should turn 2600 r.p.m. at full throttle in flight at sea level. If in doubt, check your Aeromatic representative for advice.

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Atlantic Carriers Keep Fare Level

Trans-Atlantic air fares will remain at present levels of about 9½ cents a mile until next March if the recommendations of 12 carriers flying U. S.-Europe routes are accepted by their respective governments.

Members of the North Atlantic Traffic Conference of the International Air Transport Association decided at their recent New York meeting to hold a special session Nov. 17 to discuss rates for the remainder of 1948. By November the carriers hope to have ready a 12-month study of operations which will permit a better forecast of costs and the need for rate adjustments.

▶ **Simplify Tariff**—Meanwhile, the conference voted to simplify its tariff structure for the carriage of goods by abolishing the present classifications of air freight and air express and establishing a single overall classification of air cargo. To encourage volume use of air cargo over the North Atlantic, the carriers will ask government approval of a 25 percent discount on shipments over 100 lb. They also plan to set up specific commodity rates for certain types of goods to promote their shipment by air.

A special subcommittee was named to discuss with the steamship companies the possibility of restoring prewar arrangements for interchange of sea-air traffic. Under such arrangements, it would be possible for a traveler, in a single ticketing transaction, to fly the Atlantic and have his heavy baggage shipped by sea, or to make one leg of his trip by air and another by sea.

▶ **New Members**—Two new members, SABENA, Belgian airline, and British South American Airways, were admitted as active members of the North Atlantic Traffic Conference at the New York meeting. Other members are Air France, American Overseas Airlines, BOAC, Danish Airlines (DDL), Norwegian Airlines (DNL), KLM, Pan American Airways, Swedish Airlines (SILA), Trans-Canada Air Lines and TWA. The 12 lines carry an average of 6,000 passengers weekly across the Atlantic.

CAB ACTION

The Civil Aeronautics Board:

- Dismissed **All American Aviation's** application for helicopter routes in Philadelphia and Pittsburgh areas at applicant's request. (Docket 2588.)
- Ordered **Northwest Airlines** to show cause why its temporary mail pay for services from Seattle and Minneapolis to Anchorage should not be 59 cents a plane mile starting Jan. 1, 1947, and for service westward of Anchorage to the Orient $1.75 a plane mile after operations begin (about July 15).
- Authorized **TWA** to suspend service temporarily at Tripoli, Libya.
- Rescinded orders authorizing **Empire Air Lines** to suspend service at Pullman, Wash.-Moscow, Ida., on AM 78 and authorizing **Monarch Air Lines** to suspend service at Gallup, N. M., on AM 73.
- Permitted **Colonial Airlines** to inaugurate nonstop service between Washington, D. C., and Scranton-Wilkes-Barre, Pa., and between Syracuse, N. Y., and Ottawa, Canada.
- Permitted **Trans-Canada Air Lines** to serve Sault Ste. Marie, Mich., through Kinross Airport.

SHORTLINES

▶ **American**—Inaugurated daily DC-6 service between Washington and San Francisco last week.

▶ **American Overseas**—Reported week ended June 14 was biggest in company history with 1,556 trans-Atlantic passengers carried, including 866 eastbound.

▶ **BOAC**—Carried more than 8,000 passengers between New York and London during the year ended July 1.

▶ **Colonial**—This month received a silver trophy from the Canadian Province of Quebec's Safety League for flying 17 years without a fatal accident.

▶ **Delta**—Recently elected R. W. Freeman, New Orleans; Edward H. Gerry, New York City; Winship Nunnally, Atlanta, and Richard J. Reynolds, Winston-Salem, N. C., as new members of its board of directors.

▶ **Eastern**—Is enlarging its 36th st. terminal in Miami to more than twice the present size. The $75,000 expansion will permit the terminal to handle up to five Constellations and 300 persons at one time.

▶ **Pan American**—Has signed a contract with the Calavo Corp. to fly between five and seven million pounds of avocados from Havana to Miami this summer. DC-4s, each carrying 20,000 lb., will make between 250 and 350 trips for the highly-perishable $1,500,000 cargo. . . . Weekly all-cargo service between San Francisco and Manila was instituted this month with DC-4s.

▶ **Scandinavian Airlines System**—Carried more than 2,300 passengers and nearly 300,000 lb. of cargo to Europe during the first half of 1947. Eastbound load factor was 99.5% in June against 99.3% in May.

▶ **Trans-Canada**—Inaugurated more direct, faster transcontinental service this month over its new Great Lakes airways which adds intermediate stops at Sault Ste. Marie, Mich., and Fort William-Port Arthur, Ont. Carrier formerly flew a ciruitous route north of the Great Lakes. . . . TCA has named Anson C. McKim, Canadian member of the ICAO Council, as vice president in charge of administration.

C&S Offers Discounts To Mid-week Passengers

Chicago and Southern Air Lines last week instituted 15 percent reductions on mid-week round trip fares between selected pairs of cities on its system.

To take advantage of the savings, a passenger must arrange his itinerary to travel on a Tuesday, Wednesday or Thursday on both the going and returning portion of his trip. Tickets remain valid for 16 days from commencement of passage, and this discount is valid on the following runs: Chicago-Memphis, Chicago-Jackson, Chicago-New Orleans, St. Louis-Memphis, St. Louis-Jackson, St. Louis-New Orleans, Memphis-Jackson, Memphis-New Orleans, Jackson-New Orleans and Houston-Shreveport.

PCA, Steamship Line Offer Packaged Tours

Eight-day all-expense vacations by plane and Great Lakes steamer are being offered on a credit basis by Capital Airlines (PCA) and the Detroit & Cleveland Navigation Co.

The air-water packaged cruises were to begin July 12, with PCA flying Washington, D. C., area vacationists to and from Buffalo, N. Y., terminal point for D & C's Great Lakes trips. The credit plan provides for small monthly payments extending over a year. PCA states it will offer similar tours originating at other points on its system if the initial trips prove successful.

Nonscheduled Lines Get Letters of Registration

More than 260 nonscheduled air carriers, mostly small fixed base operators, have received letters of registration from CAB which will permit them to continue flying under section 292.1 of the Board's Economic Regulations.

By early last week, 378 applications for letters of registration had been received by CAB. The revision of section 292.1 which became effective June 10 provides that no irregular (nonscheduled) air carrier may engage in any form of air transportation after Aug. 10 unless a letter of registration has been applied for.

AOA Gets Bank Credits

American Overseas Airlines has completed negotiations for bank credits and term loans totaling $12,000,000 which will be used to purchase new equipment including eight Boeing Stratocruisers now on order.

LAA Opening Set

Los Angeles Airways' target date for opening service on part of its certificated helicopter airmail routes is between Oct. 1 and 20. Carrier expects delivery on its first Sikorsky S-51 this month, with three more to be on hand when operations start.

CAB SCHEDULE

July 15. Hearing in Northeast Airlines' mail rate case. Postponed from June 30. (Dockets 1932 and 1890.)
July 16. Oral argument in TWA's mail rate case. (Docket 2849.)
July 16. Prehearing conference on Resort Airlines' "All Expense Tour" Certificate Application. (Dockets 2377 and 2571.)
July 28. Hearing in Chicago Helicopter Case. Postponed from July 14. (Docket 2384 et al.)
July 28. Hearing in All American Aviation's mail rate case. Postponed from July 21. (Docket 1906.)
Aug. 25. Hearing in case involving additional service in California-Nevada area. Postponed from July 17. (Docket 2019 et al.)
Sept. 2. Hearing in Latin American Certificate Amendment cases of Panagra and Braniff. (Dockets 2527 and 2622.)
Sept. 8. Hearing on Mid-Continent's proposed service between Minot, N. D., and Regina, Saskatchewan. (Docket 628.)
Sept. 29. Hearing on Mid-Continent's application for alternate Kansas City-New Orleans Route. (Docket 1956.)
Oct. 7. Hearing involving additional Florida Area Service. Postponed from Aug. 12. (Docket 1668 et al.)
Nov. 15. Hearing on Board's Investigation of Consolidated Airfreight Tariff Agreement. (Docket 2719.)

3 Mail Pay Cases Test CAB Policy

Indication of how far CAB will go in underwriting the unprecedented losses of the domestic airlines in 1946 and the first quarter of 1947 will be provided by three mail rate cases now before the Board.

TWA and Capital Airlines (PCA) are bucking the strenuous opposition of the Board's Public Counsel in asking for retroactive mail pay increases aggregating $16,451,000 for periods dating back to 1942. And United Air Lines this month became the second of the transport industry's "big four" to join the sizable list of carriers seeking additional mail compensation.

▶ **Costs Soar**—Largest mail carrier in the country during 1946, UAL—like TWA, PCA, Chicago & Southern, Colonial, Continental, Northeast and Western—has informed the Board that rates set during the war period are now inadequate because of soaring costs and smaller loads. Without naming a definite figure, United said its mail compensation of 45 cents a ton mile, which became effective Jan. 1, 1945, is "less than fair and reasonable" and should be increased "substantially" retroactive to Jan. 1, 1947.

The PCA and TWA cases probably will be decided this summer, with oral argument on the former proceeding held early this month and argument on the latter scheduled July 16. Public Counsel in both proceedings have held that the carriers' request should be denied not only because of the Board's well-established policy that final mail rates in effect prior to the date of filing a petition will not be increased retroactively but also because the Civil Aeronautics Act gives no authority for such adjustments. PCA filed its petition Jan. 14, 1947, and TWA filed two months later.

▶ **Requests Listed**—TWA, which along with Eastern, United and American has been carrying mail at the non-subsidy rate of 45 cents a ton mile, is asking that its $3,541,000 compensation for the period Jan. 1, 1946, to Mar. 14, 1947, be increased over 300 percent to $14,698,358. PCA, which has a 60 cents a ton mile rate, wants an additional $5,294,344 for the period June 1, 1942, to Dec. 31, 1946.

Public Counsel in the PCA case have pointed out that granting the carrier's petition would establish a precedent authorizing retroactive review of all rates. 'This would convert CAB's present rate-making policy into a cost-plus (fixed fee) arrangement and destroy those incentives toward economy and efficiency that are inherent in prospective rate making."

▶ **Public Counsel's Position**—TWA had asserted that its need for a retroactive mail pay boost was the result of "unusual circumstances" beyond its control, such as the pilot strike and the grounding of the Constellations. But Public Counsel said that CAB, in setting rates, placed them high enough to allow for unforeseen difficulties and that it was the carrier's responsibility, not the Board's, to shoulder business risks.

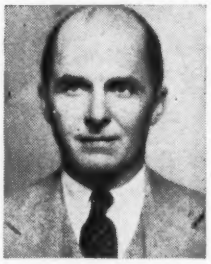
In a petition supporting its request for retroactive mail pay increases, PCA informed CAB that it is "on the very threshold of bankruptcy" despite small operating profits in April and May. The carrier said its working capital is exhausted and its stockholders' equity "completed wiped out" as the result of inadequate mail compensation. PCA states it is now faced with the necessity of raising new working capital through issuance and sale of additional stock at a tremendous financial sacrifice.

FAST TICKETER

American Airlines will install this automatic ticket vending machine at high-volume terminals throughout its system if tryouts now under way in the Boston ticket office prove its practicability. Filled with pre-printed tickets, the machine is operated when the agent puts in a slug and pushes the slide. The ticket pops out from the slot near the top. Only paper work the agent has is entry of trip, date and time on the back of the passenger's part of the ticket.

Lipscomb Quits American

Willis G. Lipscomb, assistant vice president and general traffic manager of American Airlines, has resigned to become vice president in charge of traffic and sales for Pan American Airways. The PAA post formerly was held by V. E. Chenea, who resigned recently on the advice of his physician (AVIATION NEWS, June 23).



Lipscomb

Walter Sternberg, American's director of passenger sales, has taken over Lipscomb's former duties with the title of general sales and traffic manager. General traffic manager of Eastern Air Lines until June, 1946, Sternberg then joined American Overseas Airlines as director of international traffic procedures. He became AA's director of passenger sales last fall.

TWA Shakeup Hits Regional Staff

Another far-reaching reorganization of TWA, which centers the carrier's administrative setup in Kansas City and already has resulted in a number of resignations and job shifts, is under way with the approval of the company's board of directors.

Regional offices in New York, Chicago and Los Angeles will lose their status, with all administrative functions transferred to Kansas City. The offices themselves will be retained at the three cities.

▶ **Savings Seen**—President Lamotte T. Cohu said the reorganization will save TWA more than $1,000,000 annually.

Previously, each regional general manager was in charge of all activities for his area. The shift will place the heads of the New York, Chicago and Los Angeles offices under E. O. Cocke, vice-president in charge of traffic, at Kansas City. The International Division, under Vice-president and General Manager Otis F. Bryan, also is reported to be involved in the reorganization.

Among the developments announced:

- Transfer of the International Pilot Training Division from New Castle, Del., to Kansas City, effective Aug. 1.
- Appointment of Harold D. Koontz as executive assistant to President Cohu.
- Dale Armstrong, assistant to the board chairman of Northrop Aircraft, Inc., and director of that firm's public relations, has resigned to take over direction of TWA's publicity.

In a move not connected with the reorganization, Hal Blackburn, assistant general manager of the International Division, returned to flying the line as a pilot.

▶ **PCA Changes**—Meanwhile, Capital Airlines (PCA) also has decided to centralize its administrative setup. Eastern Region Vice-president R. E. Fell, Western Region Vice-president R. M. Averill and Southern Region Vice-president J. D. Henry have been transferred to new positions. J. Raymond Bell, the carrier's public relations director, resigned effective Aug. 1.

CNAC Asks Permit

China National Aviation Corp., Shanghai, has asked CAB for a foreign air carrier permit to operate between Shanghai and San Francisco via Guam, Wake, Midway and Honolulu. Owned 20 percent by Pan American Airways and 80 percent by the Chinese Government, CNAC proposes to fly the route initially with DC-4s.

Feeder Changes Name

Aviation Enterprises, Inc., Houston, Tex., holder of a three-year feeder, certificate, has changed its name to Trans-Texas Airways.

U. S. Exports by Air Reach Record Level

The steadily increasing volume of goods exported from the U. S. by air reached a new peak at the end of 1947's first quarter, with near-record levels continuing through April.

Both from the standpoint of value and weight, March, 1947, shipments totaling $17,839,000 and 3,663,000 lb. were considerably more than double those of the same 1946 month, according to the Commerce Department. The gain in March over February was 44 percent in dollar value and 41 percent in shipping weight. April air exports aggregated $17,016,000 and 3,502,000 lb.

▶ **Imports Lag**—Air imports, consistently behind exports during the postwar period, were $6,733,000 and 824,000 lb. in March. Dollar volume of imports rose to $6,864,000 and 851,000 lb. in April.

LaGuardia Field was the leading airport in value of air trade, with 42 percent of all exports by air and 84 percent of total air imports during March. Miami led all other points in shipping weight.

▶ **Products Listed**—Each of seven product groups accounted for March air exports valued at over $1,000,000; wearing apparel, $2,600,000; machinery and vehicles (principally airplane parts and electrical machinery), $2,500,000; medicinal preparations, $2,300,000; furs and manufactures, $1,600,000; fountain pens and mechanical pencils, $1,600,000; textiles other than apparel, $1,100,000, and jewelry, $1,000,000. Principal air imports were watches and clocks, $3,003,000; furs and manufactures, $822,000; precious stones, $643,000; precious metals, $313,000; and medicinal preparations, $233,000.

The great bulk of our air trade is with other western hemisphere nations. Highest dollar volume in air exports during March was to Mexico—$2,773,000; followed by Brazil, $2,017,000; Cuba, $1,424,000; Argentina, $1,201,000; Colombia, $1,144,000 and Canada, $471,000. In contrast, top $1,224,000, followed by Belgium, $889,000; rating European country was Sweden with Switzerland, $364,000; United Kingdom, $346,000, and France, $288,000. Air exports to the Philippines totaled $503,000 and to India, $416,000.

▶ **Russian Trade**—Receipt of more than $3,133,000 in goods from Switzerland, including $2,997,000 in watches, clocks and parts, accounted for nearly half of this country's air imports in March.

Although the U. S. exported less than $1,500 in goods to the USSR by air during the first quarter of 1947, we imported items worth more than $528,000, including precious metals totaling $256,000 in January and $262,000 in March. During April, air imports from Russia soared to $1,200,000, of which $1,135,000 was in precious metals.

WRINKLE-PROOF

Apparel salesmen are taking advantage of Western Air Lines' new policy which enables them to take garment samples on flights as personal baggage. The service eliminates packing, allowing the salesmen to display unwrinkled samples immediately upon arrival. Stewardess Paula Betz is shown hanging apparel in a full-length wardrobe on a WAL plane.

SPEEDPAK IN SERVICE

Eastern Air Lines groundcrew attaches cargo-baggage carrying Speedpak on Lockheed Constellation on Newark-Miami run. In addition to increasing payload, Speedpak, developed by Lockheed, greatly speeds handling of baggage and cargo. (Acme photo)

Senate Restores CAB Cut

Senate Appropriations Committee has restored $605,000 of House-clipped funds to CAB's budget for the 1948 fiscal year.

The Senate committee boosted CAB's allocation from the $2,535,000 approved by the House to $3,140,000. Budget Bureau recommended $3,380,000. CAB's current year appropriation is $2,490,600.

Truman Asks More Funds for Mail Pay

A supplemental appropriation of $1,336,000 has been requested by the President to cover payments on an unanticipated volume of airmail carried during the last few months of the 1947 fiscal year.

The Post Office Department estimated airmail payment requirements for March, April, May and June on the premise that the volume carried would be approximately equivalent to that carried during January and February. The airmail valume for March, April, and May, however, was "far in excess" of the January-February level, the President reported, and the indications are that the June volume will prove to be even greater.

Congressional action was completed last week on two bills carrying airmail appropriations:

1 The 1948 fiscal year Post Office Department bill provides $5,000,000 for foreign air mail transportation and $37,000,000 for domestic airmail transportation. The foreign airmail figure approved was $500,000 below the Budget Bureau's recommendation, and the domestic airmail allocation, $850,000 below.

2 The second urgency deficiency bill provides $33,377,000 for foreign airmail payments for the 1945, 1946 and 1947 fiscal years. The allocation will be used to pay carriers amounts due for foreign service under permanent rates to be set by the CAB. Carriers on most intenational routes have received payments based on temporary rates.

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Travel Red Tape Under Investigation

Congress, commercial interests seeking means to lower paper barriers.

First concerted effort in the U. S. toward removing the mountains of red tape which have acted as paper barriers to the free flow of international travel for over two decades is now underway.

Paper requirements — visas, passports, health certificates, police reports, tax returns, etc.—which discouraged steamship travel during the prewar years, now promise to cancel out the primary asset of air travel: speed.

Specific examples most dramatically demonstrate this:

• It now requires 45 minutes to clear customs inspection in Mexico. This, added to the two and one-half hours consumed in clearing U. S. inspection, equals half of the flying time between Los Angeles and Mexico City.

• A total of 526 papers must be filled out every time an airliner flies from New York to Europe. Each time a plane flies from San Francisco to Australia, a total of 2,802 sheets of paper must be filled out to cover the movement. In addition, visas, passports, health certificates and photographs for crew members must be obtained.

Both Congress and the Administration, in conjunction with private interests, are trying to reduce such paper discouragement to international travel.

▶ **Land Testifies**—At hearings before the Aviation subcommittee of the Senate Interstate and Foreign Commerce Committee, a score of outstanding experts, including Air Transport Association President Emory S. Land, have called for immediate enactment of the Brewster resolution directing a review of legislation, and regulations issued thereunder, setting up requirements for international transit. U. S. regulations on international travel now fill approximately 1,600 pages of fine print. The subcommittee will act on the resolution, pointing to a simplification of procedure, following a second set of hearings scheduled for mid-July.

A subcommittee on facilitation of international civil aviation of the Air Coordinating Committee has completed a 20,000-mile inspection tour of all major U. S. ports of entry "seeing the obstructions obstruct," according to the group's chairman, Harry Tarrington, director of international activities service of CAA's Office of Foreign Operations. Other members of the subcommittee, working with the air transport industry, include representatives of the State, War, Navy, Agriculture, and Post Office Departments, the U. S. Public Health Service, the Immigration and Naturalization Service, and the Bureau of Customs.

▶ **Dollar Problem**—At the Senate proceedings, Secretary of Commerce W. A. Harriman, Assistant Secretary of the Treasury Edward Foley, and Chairman Owen Brewster of the aviation subcommittee emphasized the importance of encouraging U. S. overseas travel so that American dollars will flow into foreign lands, permitting war-devastated areas to pay for urgently needed exports from the U. S.

With proper assistance, it was estimated that postwar U. S. international travel will mount to a volume of between $1 billion and $1.6 billion annually. This compares with a peak volume of $693 million in 1929.

▶ **U. S. to Blame**—Anticipating a major volume increase in overseas airline business once travel restrictions are removed, ATA President Land designated the U. S. as "the most backward" nation in modifying the rigid regulations built up during the interwar years in a world atmosphere of nationalistic suspicion and isolationism. He challenged Harriman's statement that the U. S. took a progressive position at the April meeting in Geneva of international experts to promote free flow of international travel.

Land called for a "drastic" simplification of paper requirements to make it possible for the travelling businessman to leave this country by air on 24 hours notice. At present, he pointed out, the minimum time required for persons located outside of Washington is one week. All passports must clear through State Department headquarters.

▶ **Recommendations Given**—Land's overriding recommendation was a "change in philosophy" in the State Department. "Instead of aiming to block travel, by applying numerous yardsticks to determine it 'unnecessary'," Land declared, "the Department must be brought to encourage travel." His three other key recommendations to the senate committee:

(1) That the Immigration and Naturalization Service, with approximately 350 offices throughout the U. S., be authorized to issue passports. This would preclude the necessity of funneling business through the State Department in Washington.

(2) That bilateral negotiations get underway immediately to eliminate visa requirements. France and Great Britain already have negotiated such an agreement. Land suggested that some type of temporary visa might be issued by the homeland of the traveller, permitting six months' stays in foreign lands. He pointed out that U. S. citizens now must make appearances at the consulates of each foreign country they desire to visit—sometimes 100 or more miles distant—in order to obtain visas. The time spent in this process, he commented is many times the time saved by air transport.

(3) Examinations of the admissibility of travelers to this country should be conducted at points of embarkation abroad. At present, visas issued by U. S. consular officers abroad do not assure admission into the U. S. U. S. airlines, considering themselves common carriers, Land related, pick up all passengers abroad with visas from U. S. consular officers, but if a passenger is refused entrance into the U. S., the airline conveying him to this country is liable to a $1,000 fine. The carrier must pay all the passenger's expenses while he is detained in this country and make a fare refund.

HORIZONTAL COMFORT

The "sleeperette compartment," soon to be introduced aboard planes in Pan American Airways' trans-Pacific service, features a new type seat which at the touch of a button becomes a full-length lounge with a specially-designed head and foot rest. To provide leg room, distance between sleeperette seats will be 60 in. against 40 in. for conventional seats, and DC-4s fitted with sleeperettes will carry 30 instead of 44 passengers. The compartment can be completely enclosed by curtains. When the seat is upright, the foot rest can be either unfolded into a table or pushed out of the way under the seat.

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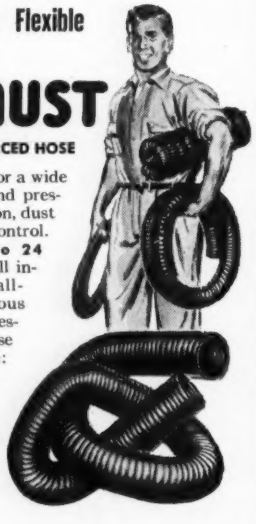

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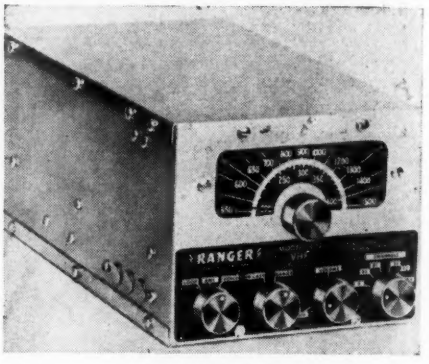
SURFACES
FUEL TANKS

NEW PRODUCTS

Powerful Lightplane Transceiver

Model 802 Ranger Airfone, VHF transmitter-receiver, is single-package unit designed to bring new high power, range, and direction finding advantages to private and business plane owner. Maker is **Electronic Specialty Co.,** Los Angeles, Cal. Featured are all six transmitting frequencies (122.1, 122.3, 122.5, 122.7, and 122.9 mc.) alloted to private flyers, including special international frequency channel of 121.5 mc. assigned to military and civil aircraft for use in emergency air contacts,



plane-to-ground contacts, and direction finding. Seen of particular interest to plane owners is 1.5 to 2.0w. transmitter output, approaching power of many airline sets. Both transmitter and two-band receiver, together with power supply, are contained in one cabinet measuring 4½ in. by 5⅞ in. by 11¼ in. depth. Total weight is but 8 lb. 12 oz. Receiver portion includes 195-410 kc. band and 550-1,600 kc. broadcast band. Available for speaker operation is 4½w. output, insuring ample volume in planes not soundproofed. There is provision for headphones. Three-position antenna switch makes possible installation of a direction-finder loop, or use of regular antenna, or elimination of range signal during weather broadcasts from range stations by a choke-type voice filter. A 20-in. quarter-wave mast is used for VHF transmitter.

Prefabricated Hangars

Illustrated here are prefab hangars being marketed by Washburn Mfg. Co., 1276 Princeton Ave., Trenton, N. J., photo showing units installed at Worth Aviation Activities, Florence, N. J. Maker reports hangars are available on long term financing. Construction is of completely prefabricated factory section designed for bolted assembly at erection site. Company has been in production for two years.

SEARCHLIGHT SECTION

(Classified Advertising)

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BUSINESS
AIRPLANES
EQUIPMENT

(used or resale)

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Positions Wanted (full or part time salaried employment only), ½ the above rates payable in advance.
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An advertising inch is measured ⅞" vertically on one column, 3 columns—30 inches—to a page.

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EMPLOYMENT OPPORTUNITIES in the Navy Dept.—east and west coast areas—for scientists and technicians: For current vacancies consult the Scientific Personnel Bulletin, Employment Series, of the Office of Naval Research on file at Naval activities, colleges, professional societies, scientific journals, regional offices of the U. S. Civil Service Commission, etc., or address specific inquiries, stating qualifications, to the Scientific Personnel Branch, Navy Dept., Washington 25, D. C.

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SALES AGENCY—An opportunity to build a business of your own under the direction of a national aviation sales organization. Unusually high earnings possible (Upwards of $1000 per month). You must have sales ability, be willing to work hard and sincerely believe in the future of aviation. Sole of planes or equipment not involved. Five to ten thousand dollars required depending on the territory. A knowledge of aviation is helpful but you must not now be a flight operator. Only one appointment open from each non-competitive market area. Give full particulars of your background and how you can be reached by telephone to arrange a preliminary interview. National Flight System, Suite 1112-A, 610 So. Broadway, Los Angeles 14, Calif.

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(Continued on page 62)

Solves Many Fastening Problems . .

DILL *Lok-Skru*

Triple Duty Fastener

RIVET · ANCHOR NUT · SCREW LOCK

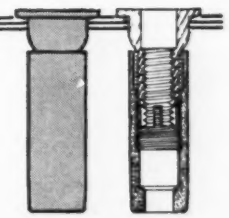
Blind or Visible Attachment

Complete Installation in Seconds

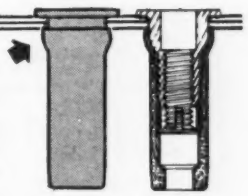
1 Drill *ONE* Hole

2 Insert LOK-SKRU

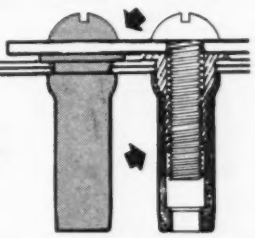
(Types with flat, flush, countersunk or spacer head. Sizes as required for metal thickness and hole diameter.)



3 Draw LOK-SKRU sleeve against inner side of metal with special power or hand tool, to rivet sheets securely. LOK-SKRU head, tapped for 6, 8, or 10/32 machine screw, provides an anchor nut.



4 Screw, to fasten attachments, is locked in anchor nut by tension grip.



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(Continued from page 61)

FOR SALE

New BG-4B2S Spark Plugs
75c each. Discount to dealers. Send for latest catalog. Karl Ort, Dept. SP-13, York, Penna.

OFFICIAL PROPOSAL

Bids: August 19, 1947 (100)

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Sealed bids for the leasing and operating of a public airport known as Linden Airport, formerly known as the Eastern Aircraft Airport at Linden, N. J., located at U. S. Route 1, State Highway Route 25, and Stiles Street in the City of Linden, Union County, New Jersey, will be received by the Governing Body of the City of Linden at the City Hall, Wood Avenue and Blancke Street, Linden, New Jersey, until 9 P. M. Eastern Daylight Saving Time on Tuesday, the 19th day of August, 1947, and then publicly opened and read. Bidders may obtain "Information for Bidders and Specifications" and additional information from City Clerk, City Hall, Linden, New Jersey.

Each bidder must deposit with his Bid a certified check made payable to the order of the City of Linden in the amount of $5,000.00, subject to the conditions provided in the "Information for Bidders and Specifications".

No bidder may withdraw his bid within forty-five (45) days after the actual date of the opening thereof. The right is reserved to reject any or all bids, to waive any informalities in the bids, and to accept the bid deemed most favorable to the interests of the City of Linden.

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Thomas J. Wieser
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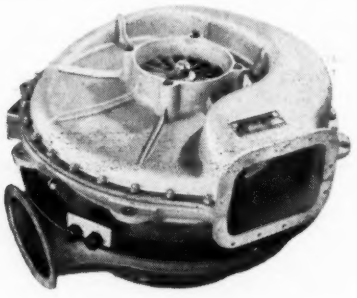

SPECIFICATIONS

GENERAL ELECTRIC	ALLIS-CHALMERS
AAF Class 03-E	AAF Class 03-E
Type B-31 FW	Type B-31
Model No. 7S-B-31-A1	Model No. 7S-B-31-A1
A.F. Spec. No. R-28502-31	A.F. Spec. No. R-28502-31
A.F. Setting 1	A.F. Setting 1
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Shipping Size 12 cu. Ft.	Shipping Size 14 Cu. Ft.

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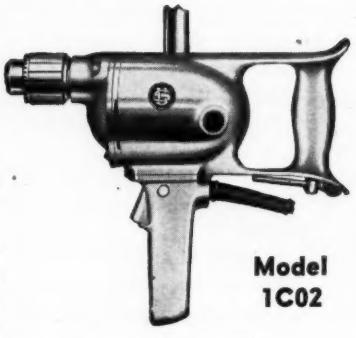

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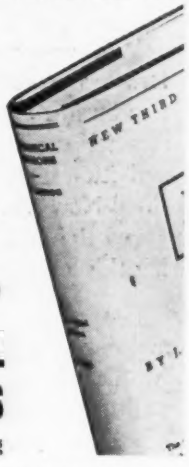

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EDITORIAL

Take Airports Out of Politics

Selection by the New York Port Authority of Hervey Law as director of its three major metropolitan airports is deserving recognition of a proven administrator. Mr. Law has an aviation background of 30 years. But he has built his reputation in airport management in hardly more than three, directing the third busiest airport in the country—Washington National.

Washington revenue has nearly doubled since 1943. Law has proved his contention, and that of other progressive business leaders, that an airport must capture a substantial part of its income from non-aviation commercial activities such as advertising and concessions. At the three New York air terminals—LaGuardia, Idlewild and Floyd Bennett, all in weak financial condition—continuing this business philosophy will be vital.

Despite his outstanding fiscal record, however, Law's appointment carries an added significance to aviation. Municipal airports in this country have been cursed with politics. The shabby national practice has tossed the job of airport manager to the local political wolves, who shoved an incompetent into the spot or, if the selection was one of merit, refused freedom to anyone who sought to make a businesslike record.

As Louis R. Inwood, Kansas City Director of Airports, said so aptly before the Municipal Finance Officers Association in New York, the investment in an airport manager usually has no relation to the investment in the airport or the amount of business enterprise that should be promoted to make the airport self-sustaining.

Too often, the choice of an airport manager lies between a broken down politician and a broken down aviator, Mr. Inwood says. "Either choice is usually fatal. If the municipality decides it must have a politician it should pay enough to get a good one, because a good politician will have sense enough to employ competent assistants in order that he may retain the job. If the municipality decides to hire an aviator, they should secure one who has demonstrated his ability as an administrator and not as a hot pilot."

The speaker wisely pointed out to the municipal officers that the first and most important step in proper maintenance and operation of any airport is in picking a manager. "All else pales into insignificance."

Running an airport is a business. Aviation needs business men now above all else. The New York Port Authority's sagacious choice is an encouraging harbinger of a new deal for aviation generally, as well as for Metropolitan New York. Other cities wallowing in inefficiency, politics and red ink might take notice.

Maybe the citizens of some of them will remember, too, that the independent port authority idea is a possibility if the local political machine persists in bleeding the taxpayer via the local airport.

Maybe Pessimists Are Lazy

The pessimists seem to be enjoying the momentary slump of personal aviation. In their studied undertaker manner they are harking back to the hamburger days of '29 with that "I told you so" air.

Somehow, they forget that there are now about 100,000 aircraft registered and a monthly production of several hundred light aircraft that stands out in brilliant contrast to previous personal aviation depressions.

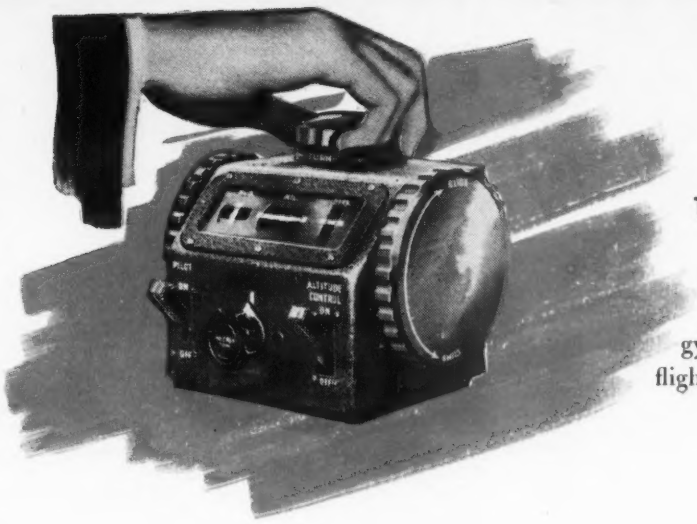
These widely circulated whines of the ne'er-do-wells need leavening by such a widely respected business leader as A. J. Weatherhead, Jr., president of The Weatherhead Co., and president of Aviation Distributors & Manufacturers Association.

Mr. Weatherhead last week voiced a long-range optimism about aviation at the ADMA summer meeting at Mackinac Island and compared aviation with the automotive industry. He said:

"Many people have stated they think the aircraft industry is reaching a saturation point both in number of private planes and flyers and in expansion of airlines. Gentlemen, this same thing was said 25 years ago about the automotive industry when we had a couple of hundred thousand cars and few roads. You know what happened. Today we have 33 million cars and thousands of roads."

The pessimists may enjoy ill health, but we prefer to listen to energetic optimists and salesmen with successful business records to back them up.

ROBERT H. WOOD



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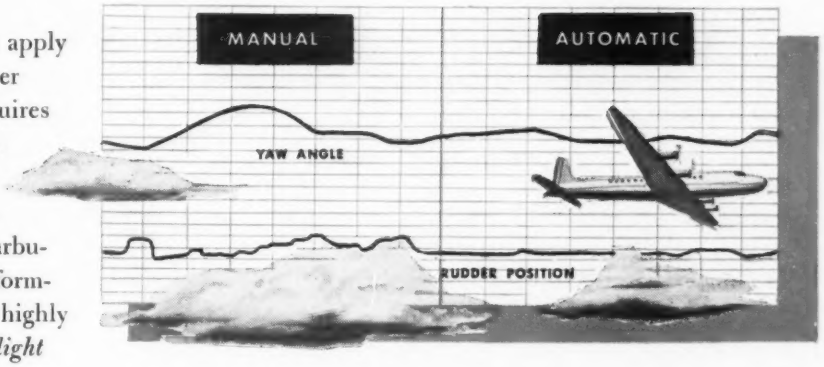
helps the human pilot to do his job better and with less effort than by manual manipulation of his controls . . . gives him complete gyro-stabilized control of his aircraft under all flight conditions.

For Smoothest Flight at all Times

the A-12 Gyropilot has the ability to apply gentle but alert control corrections whenever needed. This improved *automatic* control requires half or less the control movement a human pilot applies trying his best to hold the plane in smooth flight. Actual continuous recordings (right) of flight through turbulent air show a marked difference in performance between *manual flight* with a highly competent human pilot and *automatic flight* with the highly competent A-12.



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with tight, deadbeat control of aircraft eliminating over-control, "hunting" and "wallowing" . . . providing smoother, more comfortable, more enjoyable flying.

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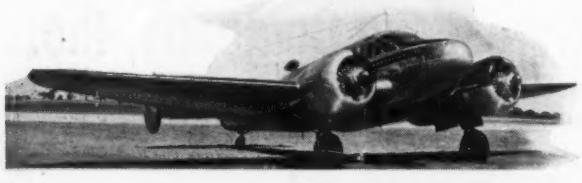
Two groups of business executives in their companies' Beechcraft Executive Transports pass each other along the highway of the sky. One plane carries men from a great rubber company on their way to Detroit for a 2 o'clock conference with motor officials. They'll be home in time for dinner. The other Beechcraft carries mining men from the west en route to New York. They've saved exactly a week of man-days since leaving their office this morning.

And along all this limitless right-of-way, other Beechcraft Model 18's are solving the problems of other companies in getting executives from where they are to where they want to go . . . in the shortest space of time, in the greatest possible comfort, at the lowest possible cost.

Your nearest Beechcraft distributor is prepared with facts and figures to help you appraise company-owned air transportation in the light of your own transportation needs. He welcomes the opportunity to demonstrate to you the new Beechcraft Model 18 Executive Transport, in daily use by nearly 400 companies in the United States. Beechcraft distributors are located in key cities across the U. S. A.



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AVIATION WEEK

JULY 21, 1947

INCORPORATING AVIATION AND AVIATION NEWS

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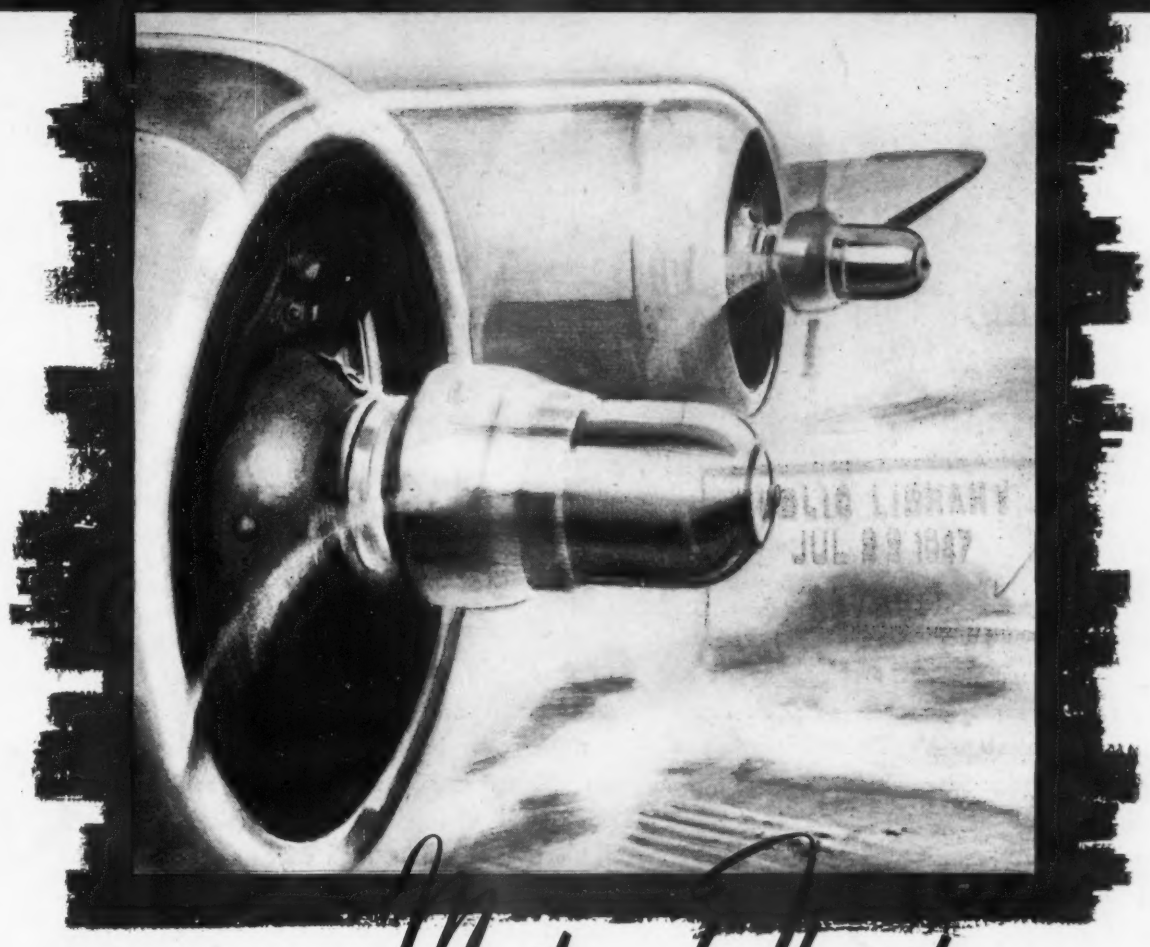

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The same painstaking research and intensive development that have made Hamilton Standard propellers famous wherever man flies have resulted in the new reversible Hydromatic which marks another major contribution to aeronautical progress.

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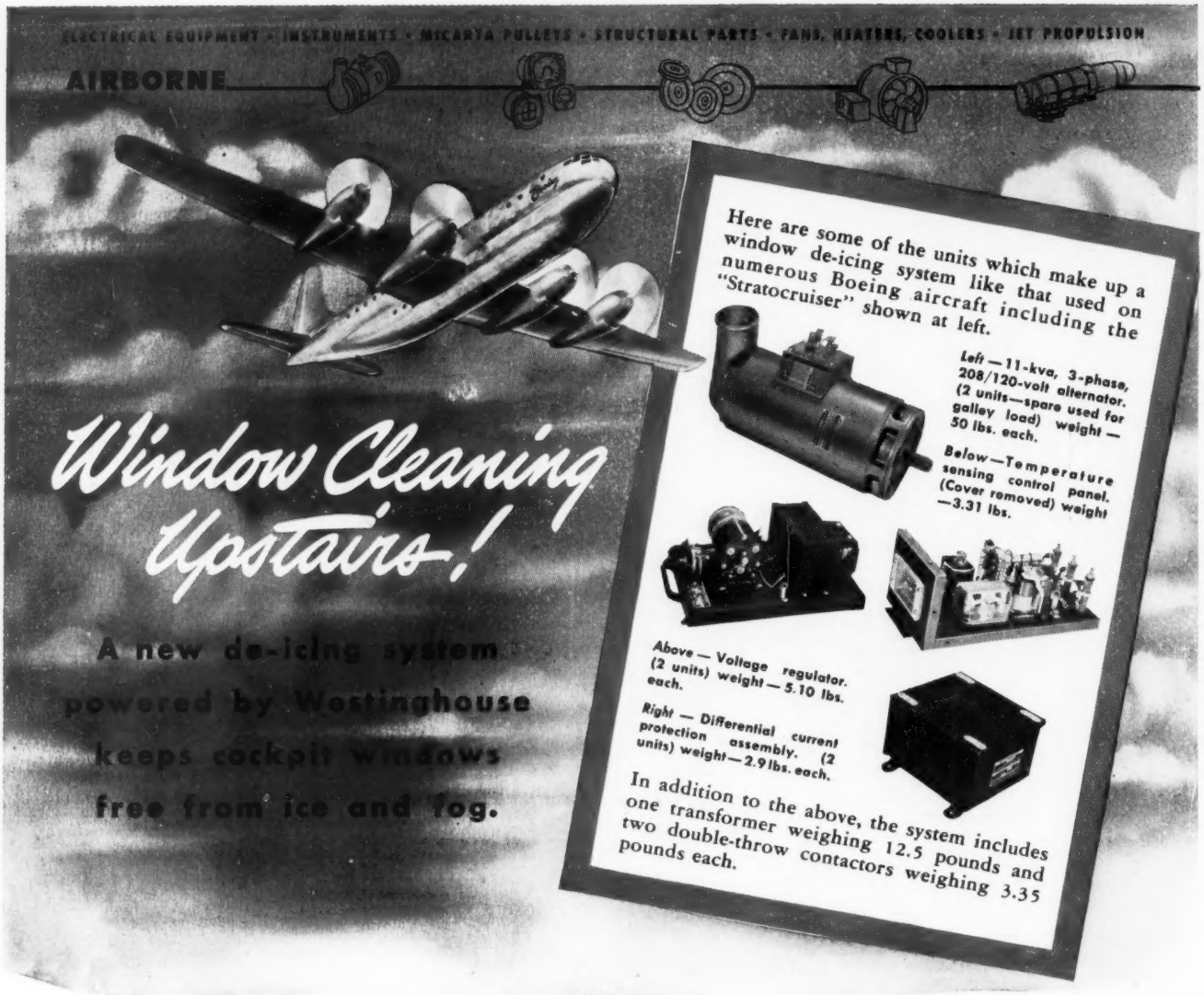
ELECTRICAL EQUIPMENT • INSTRUMENTS • MICARTA PULLEYS • STRUCTURAL PARTS • FANS, HEATERS, COOLERS • JET PROPULSION
AIRBORNE
Window Cleaning Upstairs!
A new de-icing system powered by Westinghouse keeps cockpit windows free from ice and fog.
Here are some of the units which make up a window de-icing system like that used on numerous Boeing aircraft including the "Stratocruiser" shown at left.
Left — 11-kva, 3-phase, 208/120-volt alternator. (2 units—spare used for galley load) weight — 50 lbs. each.
Below — Temperature sensing control panel. (Cover removed) weight —3.31 lbs.
Above — Voltage regulator. (2 units) weight — 5.10 lbs. each.
Right — Differential current protection assembly. (2 units) weight — 2.9 lbs. each.
In addition to the above, the system includes one transformer weighing 12.5 pounds and two double-throw contactors weighing 3.35 pounds each.

Here's an opportunity for you to pack more safety into plane design. A completely automatic de-icing system for cockpit windows . . . another Westinghouse product that performs a vital function in aviation.

First proof of the outstanding performance of this equipment came from an initial installation on the famous Boeing "Stratocruiser" pictured above. Then followed similar applications on other Boeing craft already in the air or in the production or design stage.

De-icing is accomplished by applying voltage to the new NESA safety glass developed by the Pittsburgh Plate Glass Company. This glass has a thin transparent film of electrically conductive material over its entire area. This assures uniform heating of each window and prevents optical distortions which sometimes occur in systems using embedded wires or concentrated heat sources. And because Westinghouse furnishes *all* of the electrical equipment for this new system, you gain the advantage of unit responsibility backed by vast research and engineering facilities devoted to aircraft.

For full details on this important advance in de-icing equipment call your local Westinghouse office or write to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Penna.

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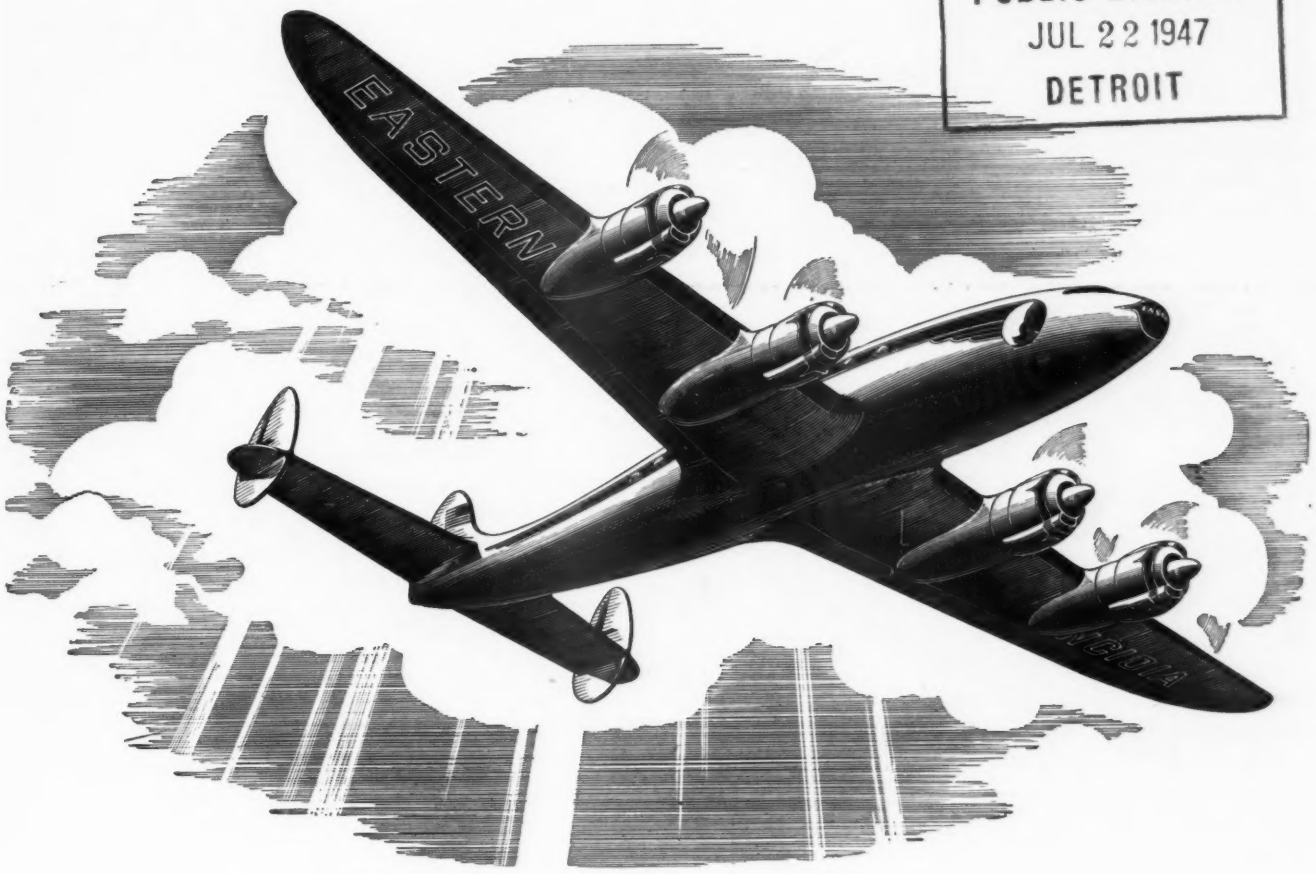

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Latest addition to the famous fleet of Eastern Air Lines is the giant New-Type Constellation—world's fastest, most powerful airliner. This great plane is designed not only for luxurious air travel at its best, but for the most *reliable* performance, the most *dependable* service.

U. S. Royal Aircraft Tires, too, are designed and built to match the faultless performance of the modern planes they serve. And as American aviation continues to add new luster to its name, "U. S." keeps pace by developing lighter, stronger U. S. Royals for huge Constellations and private planes alike.

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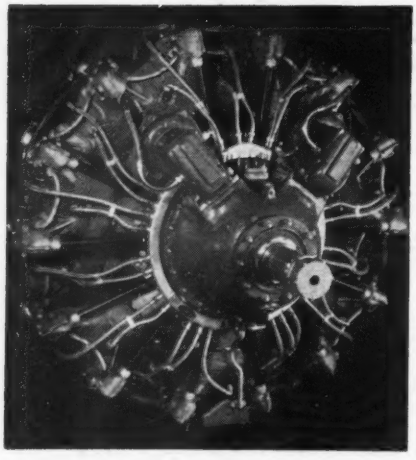

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A Principal Factor in Safe Flying . . .

Titeflex IGNITION SHIELDING, developed for all types of aircraft, successfully eliminates radio interference caused by the ignition systems and auxiliary electrical wiring. Proper shielding assures clear communications and thereby contributes substantially to safe flying despite adverse weather conditions.

Titeflex is constantly developing newer types of conduits and assemblies to meet the most exacting requirements for the latest aircraft being flown today.

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AVIATION WEEK

Vol. 47 No. 3

INCORPORATING AVIATION AND AVIATION NEWS

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You realize suddenly that you are seeing more than just a spectacle. You are witnessing the peace power of American air power. For up there in the cloud-flecked sky flies our great hope for peace and security.

On August 1st — Air Force Day — the AAF at home and on far-flung outposts will rededicate themselves to that high purpose: to keep the peace they did so much to win.

We at Boeing claim a special kinship with the incomparable men of the Army Air Forces. For years, we have worked in close co-operation with them to develop and produce America's strongest guarantee of peace — a balanced, highly efficient, economical air force. We join with all Americans in paying tribute to them on Air Force Day.

AIR POWER
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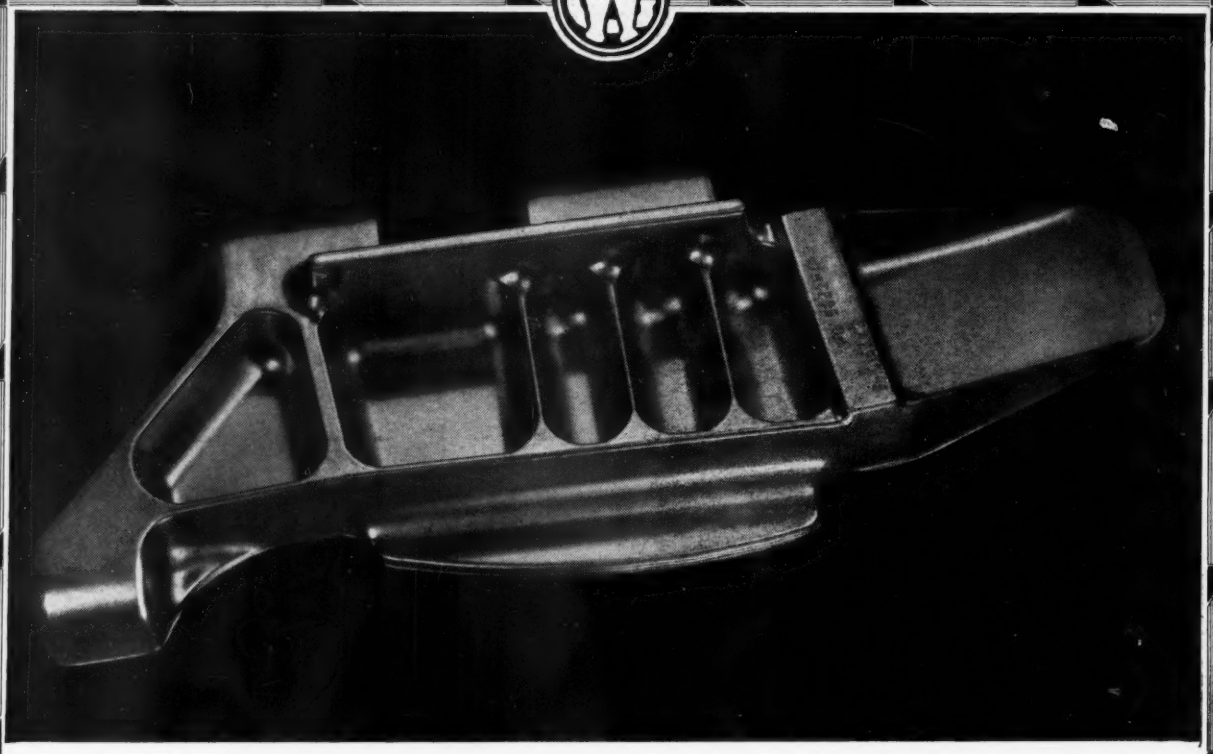
IS PEACE POWER

Take the children with you when you visit the exhibits at your nearest Army air base on Air Force Day.

BOEING

DESIGNER AND BUILDER OF THE B-17 FLYING FORTRESS, THE B-29 SUPERFORTRESS, THE NEW B-50, STRATOFREIGHTER AND STRATOCRUISER



Typical of many Wyman-Gordon developments is this complicated light alloy forging used in the wing structure of one of Uncle Sam's latest fighting planes.

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THE AVIATION WEEK

MANUFACTURERS WATCH THE HILL—Attention of heavy aircraft manufacturers late last week remained on Capitol Hill.

Unification still looked certain.

Two proposals affecting procurement policies—repeal of some parts of the Vinson-Trammell Act, and the General Procurement Bill, were in the "if stage."

So were several measures concerned with research.

There is no general opposition. The fight is against the clock.

As to appropriations, the industry knows where it stands: more funds available this fiscal year than last for both Army and Navy aircraft.

Problem will be to get it spent fast enough. Douglas, long an industry leader, reported a dwindling backlog at the end of the first half of its fiscal year. Its shipments outstrip orders by some $35,000,000.

This may be the harbinger of the shrinking transport market. Military business must take up the slack. Increased contract authorizations for both Army and Navy mean new orders for military transports, as well as new and fantastic fighters.

BOGGED DOWN IN SAFETY—The week dragged on with few constructive accomplishments in the drive for safer air travel. A non-scheduled airline's Florida crash with a DC-3 made another batch of headlines but it lacked the shock that a certificated airline accident always brings.

The director of CAB's Safety Bureau stepped out after only a few months service. No one was surprised. The accident investigation authority granted by law to CAA and CAB has been seized by the President's Air Safety Board. This has demoralized the regular accident investigation staffs. The new board is defense and prosecuting attorney, judge and jury as well.

Meanwhile, the Eastern and United accidents are still mysteries. According to the engineers they couldn't have happened. Don't expect early reports on either.

Congress claims it wants safer air travel and chops off funds for aids until industry, the Services and CAA can get together. Chances of anyone getting stubborn CAA to listen to reason appear slim. The CAA mentality epitomized by Charlie Stanton, top henchman of the old guard, is coming out on top again. CAA is so far behind the procession in technical brains and development that it's tragic. Everyone says so—Army, Navy, airlines, instrument manufacturers, aircraft producers.

Additional complaints on CAA came from Capitol Hill. The Hinshaw report indicated Congress would turn thumbs down on CAA's pre-war VHF equipment, and would approve only equipment based on radar applications. These CAA has consistently opposed.

AIR POLICY BILL—In the manufacturing industry's viewpoint, one of the most encouraging actions of Congress to date was the reporting out by Senate Interstate and Foreign Commerce committee of the bill establishing an air policy board. If enacted, this might be more important in the long run than increased procurement funds just made available by Congress.

In itself, the Policy Board—and its recommendations—would solve nothing. But the logical outcome of the Board's investigation would be a recommendation for a national air policy—in effect, a long-range procurement program. Although even this long-range program, if eventually adopted, would be subject each year to the wavering of the appropriations committees' opinions, it is possible to so spell out a national policy that it could be used as a planning instrument by the Air Forces, and a talking point in seeking appropriations each year.

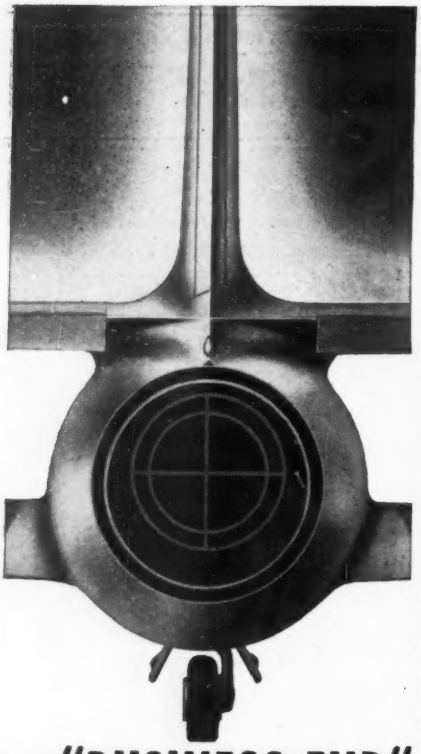
RESIGNATION RUMORS—Peddling of reports that CAB members will resign in the near or distant future has become a popular, fairly safe business. This, despite denials of Chairman Landis and member Young. The $10,000 salary limitation on CAB jobs has been an important factor in the departure of a number of top Board personnel in the past two years. The odds are always in favor of more resignations—sooner or later.

Generally unrealized is the fact that several other CAB officials are receiving almost the same salary as CAB members themselves.

In Landis' case, the denial of departure is the second in recent weeks. Young pointed out that if he were planning to resign shortly he would have conferred with Mr. Truman on the subject. He hasn't done so.

STYMIED BELOW THE BORDER – Trouble is brewing for U. S. Air Transport in Latin America. The bilateral agreement with Argentina last May, hailed as a great U. S. victory for principles of free competition, apparently is being knifed behind the scenes in Argentina.

The U. S. is still unable to get entry into Mexico for Braniff, Eastern and Western, who were certificated for routes in CAB's Latin American decision well over a year ago. Meanwhile, our flag carriers are beginning to feel the pinch of stiffer competition from Latin American lines and will soon be complaining loudly.



THE "BUSINESS END"
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The now familiar Lockheed P-80 Shooting Star may well claim the distinction of being America's first jet plane to achieve mass producible status.

We are proud that *Refrasil*, our 2000°F silica fiber low weight insulation is now regular equipment on the tail pipe of this great plane.

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WRITE...

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NEWS DIGEST

DOMESTIC

Raymond G. Lochiel, vice president and treasurer of Capital Airlines (PCA), was named vice president and controller at the company's quarterly board of directors meeting. He will have complete supervision of all corporate expenditures. J. C. Bryant, Alexandria, Va., was elected to the board, and Bryant and D. F. Gruenhagen of Minneapolis were named members of the executive committee. R. P. Wright, PCA's assistant treasurer, becomes acting treasurer.

Southern Airways, Birmingham, Ala., has made its first survey flight over part of the 1,340 miles of feeder routes granted by CAB in April. Frank Hulse, president, states regular service will begin "within the next several months."

Sen. Chan Gurney (R., S. D.), chairman of the Armed Services Committee, declared the Air Forces need 7,000 planes a year as replacements in a 28,000-plane force.

Edwin A. Link, inventor of the pre-flight, and instrument trainer, and president of Link Aviation, Inc., was awarded the Wakefield Gold Medal of the Royal Aeronautical Society of Great Britain.

New 25-cent airmail stamp for use on mail passing through San Francisco for Pacific and Asiatic areas will be issued July 30. Blue in color, it will depict plane flying above the San Francisco-Oakland bridge.

Santa Fe Skyways, uncertificated cargo carrier, has announced plans to build a freight depot at Los Angeles Municipal Airport.

FINANCIAL

General Electric Co.'s six months sales were $572,597,000, up 47 percent over the first half of 1946, part of which time the company was strike-bound.

Minneapolis-Honeywell Regulator Co.'s wage increase to factory employees is 2 cents an hour, rather than the 20 cents reported last week. This, with a raise of 10 cents granted in March, makes a total of 12 cents an hour increase.

FOREIGN

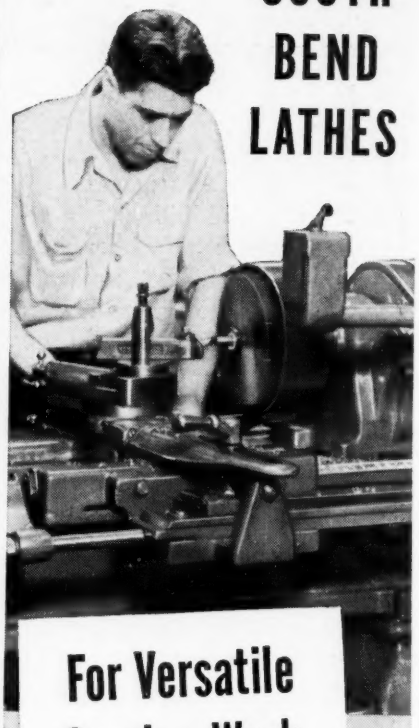
Amendment to International Civil Aviation Convention effecting the ouster of Spain from ICAO has been sent to the Senate for ratification.

Canada and Sweden have entered into an air service agreement covering a route between Montreal and Stockholm via intermediate points.

Saudi Arabia government has bought two Douglas DC-3C executive transports. The kingdom presently operates eight DC-3s.

Italy has shipped nine Fiat planes to the Argentine Aeronautics Department.

SOUTH BEND LATHES



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may depend on your action **TODAY!**

ORDER YOUR WALTER SNOW FIGHTERS

Now!

IF your plans call for additional snow removal equipment this coming winter, we make the following suggestions:

1. **Get the facts on Walter Snow Fighters** from your Walter distributor, or by writing us. Study the many exclusive Walter features. Consider their outstanding record of snow clearance thruout the snow belt.

2. **Place your orders early,** to insure readiness by snowtime. Walter Snow Fighters are carefully engineered, highly specialized equipment that can not be hastily manufactured nor delivered on short notice.

Let us schedule your needs now. Be ready for the first —and worst—snows next winter. See your Walter distributor or write us for literature.

Advantages of WALTER SNOW FIGHTERS

- **No slipping, stalling or wheel-spinning, because the exclusive 4-Point Positive Drive delivers power to each of four driving wheels according to its traction at any instant.**
- **Clear 28 foot widths in one run; clear at speeds up to 30 mph.; throw snow far to the side, making widening out easier; buck through deepest drifts.**
- **Models from 125 to 350 hp., available with correctly designed offset V-plows, one-way plows, speed plows, center scrapers, sand and chemical spreaders according to needs.**

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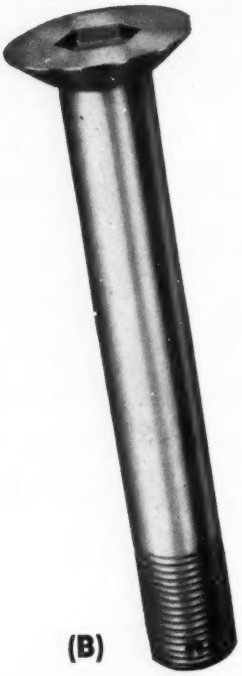

(B)

(C)

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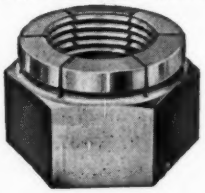

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AVIATION WEEK

JULY 21, 1947

INCORPORATING AVIATION AND AVIATION NEWS

New AAF Jet-Rocket Fighters Designed for Supersonic Speeds

Swept back wings and dual type power plants feature new high speed program for combat planes

New AAF Fighters, designed for transonic and supersonic combat speeds, are scheduled to fly before the end of the year. The new fighters are based on the principles of the swept wing mated to the turbojet engine with a generous sprinkling of rocket motors as booster units. The new planes and estimated performance:

- **McDonnell XP-85, more than 650 mph.**
- **North American XP-86, more than 650 mph.**
- **Curtiss XP-87, above 600 mph.**
- **McDonnell XP-88, over 700 mph.**
- **Northrop XP-89, more than 550 mph.**
- **Lockheed XP-90, supersonic.**
- **Republic XP-91, supersonic.**
- **Convair XP-92, supersonic.**

Threatening to outstrip present transonic research aircraft in speed, the new fighters may outmode the Bell XS-1 and X-2 and the Douglas D-558 before the transonic flight research program is fairly started. Evidence that the AAF cannot afford to wait for the timetaking research program in view of current strategic planning factors is contained in the decision to build and fly these radical new types largely on the basis of theoretical calculations and preliminary wind tunnel results.

▶ **Companies Listed**—Generally, the established fighter companies are heading the program, including North American, Lockheed, Curtiss and Republic, the wartime "Big Four" in fighter design and production. Significant is the rapid emergence of the comparatively new McDonnell Aircraft Corp., which is in the program as the only builder with two entries.

The swept wing design alleviates the onset of shock waves and thereby permits a plane to fly faster before really serious drag increases set in. By thus "sneaking in" under the sonic barrier, the new fighters are able to attain sonic and slightly supersonic speeds without running the stability risks of the straight wing airplane.

Engineers believe that the true supersonic airplane may use the familiar straight wing idea but with very low aspect ratio (wide-chord, short-span wings). Both types of wings will be extremely thin, however, to prevent excessively large accelerations in airflow over their curved surfaces.

▶ **Parasite Fighter**—McDonnell's two entries are the XP-85 Parasite Fighter and the XP-88 Interceptor. Additional details on the XP-85 reveal the use of swept wings and a combination "V" tail and conventional vertical stabilizer. All surfaces fold for stowage in the bomb bay of the Convair B-36A. The XP-85 is obviously the smallest fighter ever procured by the AAF and its stubby, barrel-shaped fuselage is little more than streamlining for the Westinghouse 24C turbojet unit. Its top speed is well over the 650 mph. mark at sea level.

Because it is designed for launching and recovery aboard the B-36A, the minute combat craft has no landing gear of any kind. The XP-88 is a long, thin swept-wing craft powered by two 24C units mounted in the belly in streamlined housings. It is slated for a top speed in the 700 mph class and may use a "V" tail.

North American's lone entry is the XP-86, a swept wing version of the successful XFJ-1 Navy Fighter. Like the navy version, the XP-86 is powered by a single J-35 turbojet unit and is slated for a top speed of better than 650 mph.

▶ **All Weather Fighter**—The Curtiss XP-87 is classified "all weather" with complete radar operations of armament, bombardment and navigational equipment. A two-man design, it is powered by four Westinghouse 24C units mounted in pairs in wing nacelles. It is an adaptation of the XA-43, following the AAF's decision to abandon "Attack" aircraft used for ground cooperation duties. Top speed is well over 600 mph. with accent on a long range of more than 2,000 miles.

Continuing the adaption of the flynig wing principle to various combat types, the Northrop XP-89 is a service version of the XS-4 Delta-wing research type. The combat version uses remote control turrets fore and aft and is powered by twin J-35 units, as in the XS-4. Late reports indicate that the XP-89 may be flying before the special research type, which was to furnish data for its design.

▶ **New Interceptors**—The XP-90, 91 and 92 are combination turbojet and rocket types intended for short-duration, high-speed operation as interceptors. The Lockheed XP-90 uses two Westinghouse 25C units for cruising power and carries two rocket motors for takeoff and fast climb to combat altitude. When the rocket units are used for operating altitude bursts of power, the XP-90 uses two Westinghouse 24C units for speed.

Republic's XP-91 is a "Buck Rogers" edition of tomorrow's fighter plane with a needle-nose shock cone to permit supersonic speed. It is powered by a special J-35 unit

STRATOCRUISER TRIES ITS WINGS

Boeing Aircraft Co.'s first Stratocruiser shown at takeoff on its maiden flight (AVIATION WEEK, July 14). With gross takeoff weight of 100,000 lb.—35,000 lb. less than maximum—plane was airborne after run of 1,400 ft. On first flight, it stayed aloft for 1 hr., 24 min., then landed and by using reversible-pitch propellers, was brought to a stop after a roll of 1,200 ft.

using water injection and thrust augmentation producing an output nearly twice that of the standard unit. For fast takeoff and rapid climb to operating altitude, it uses four super rocket motors, largest yet installed in aircraft. In addition, two smaller rocket motors are carried for acceleration through the sonic speed barrier.

▶ **Fastest Fighter**—Fastest of the group is Convair's new XP-92, which completees the transition from the XP-90 (main turbojet power, rocket boost) through the XP-91 (equal turbojet and rocket power) to main rocket power and turbojet auxiliary unit by using a single Westinghouse 19XB turbojet for cruising and a battery of liquid fuel rockets to accelerate into supersonic speed.

The AAF's transonic combat fighter program embraces the transonic zone both from the standpoint of aerodynamics and power plants. By laying out a series of craft containing a complete range of powerplant combinations and size-weight categories, the AAF is determined to go ahead into the supersonic combat area via experimental procedures rather than risk a possible long delay resulting from difficulties with the transonic research program, some of which have already been manifest.

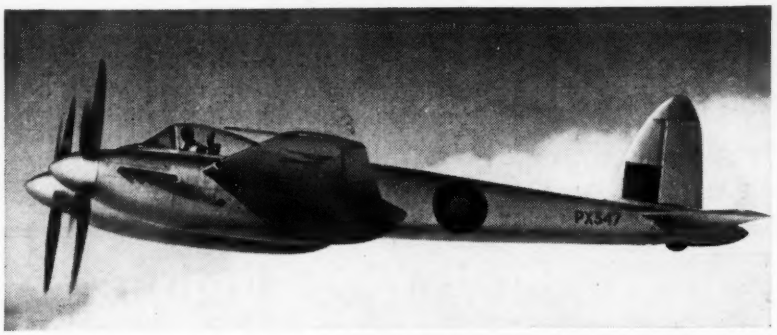
▶ **Research Progress**—A potent contributing factor is the extremely rapid transonic research progress shown by the National Advisory Committee for Aeronautics in the past year (AVIATION WEEK, July 7) which, admittedly, has already rendered the special research airplanes obsolete on the basis of new data now available. A further acceleration of this productivity is anticipated when the new, NACA Supersonic Wind Tunnels, largest in the world, are placed in operation.

By investing in these new transonic fighters, AAF is confident that it will be in a much more aggressive positoin to fully utilize new research findings than if it had waited a year for basic data to result from the XS series and Navy's D-558 plans.

Another potent factor in the AAF's decision is the extreme necessity for accumulating tactical data in the transonic range. The mechanics of coordinating speed, rate-of-climb, endurance and range with gun sighting and firing, combat maneuvers and fighter group operation are as complex and as vital to the hitting power of a transonic air force as supersonic aerodynamics. The new stable of experimental types will provide valuable data on these factors, the results of which will be available for dovetailing with new supersonic research data into designs for pure supersonic combat fighters.

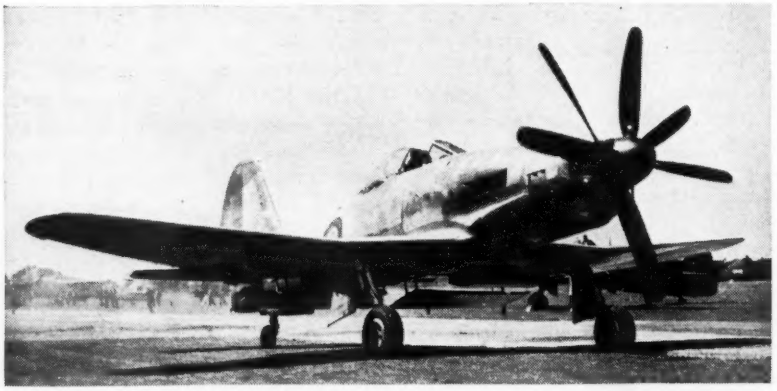
New Research Control

The University of Cincinnati's Research Foundation has accepted a $67,000 one-year research contract from the AAF to study atmospheric conditions, particularly haze. The project will be directed by Dr. Boris Podolsky, associate professor of mathematical physics. Dr. Podolsky was formerly associated with Dr. Albert Einstein at the Institute for Advanced Study, Princeton.



NEW VERSION OF HORNET

De Havilland Hornet Mark III is used as land and carrier based fighter. Powered by two Merlin liquid-cooled engines this latest version has a top speed of 480 mph which the British claim makes it the fastest propellor driven twin-engine fighter in the world. (Flight photo)



WESTLAND WYVERN INTERCEPTOR

First photos of new intercepter built to Royal Navy postwar specifications, performance details of which are still secret. Powered by Rolls-Royce Eagle driving eight blade contrarotating propeller. Outstanding features are very strong, wide undercarriage, power folding wings, extended flaps projecting well below wing, excellent visibility over nose. May later be equipped for jet assisted takeoff. (British Combine photo.)

Navy Air Force To Get $749,000,000

Conferees last week agreed to a 1948 fiscal year budget for Navy's Bu Aer totaling $501,000,000 cash and $248,000,000 contract authority. This compared with the $474,000,000 cash and $170,000,000 contract authority approved by the House and the budget of $502,890,000 cash and $248,000,000 contract authority added by the Senate.

Conferees accept, in total, the $78,000,000 in contract authorization added by the Senate for the purchase of 53 Naval land-based patrol planes. A figure of $318,000,000 for aviation maintenance was agreed to, only $1,890,000 short of the $319,890,000 proposed by the Senate.

The conference report—and its acceptance by the two houses will probably be routine—will permit the Navy to sustain the plane strength of 5,793 recommended by the Budget Bureau, including 2,475 combat craft, 885 fleet-support planes, and 2,433 training, research and other types. House cuts would have reduced the Navy's air fleet to 5,541 planes. The report carries $75,000,000 for aviation research.

NACA Budget Approved For $43,449,000 in 1948

Conferees last week agreed to a $43,449,000 appropriation for National Advisory Committee for Aeronautics for the 1948 fiscal year—$12,736,000 over NACA's 1947 budget allocation of $30,713,000.

NACA's budget was non-controversial in Congress. The $43,449,000 figure was approved by both Houses and reflected only a minor ($390,000) reduction in the Budget Bureau recommendation. It is allocated: $33,490,000 for salaries and expenses, $5,950,000 over the 1947 allocations; $80,000 for printing and binding, $5,000 over the 1947 allocation; $2,400,000 for general construction, plus $5,805,000 for construction and equipment at Langley Field and $1,674,000 for construction at the Cleveland Engine Laboratory.

Standard Radar Airways Urged by House Air Group

Hinshaw committee slaps CAA for blocking co-ordination of military-civil needs in single system; urges Federal funds to pay 75 percent of airline radar costs.

Taking a resounding slap at the Civil Aeronautics Administration and its VHF instrument landing system and omni-range airways, the House Interstate and Foreign Commerce Committee has strongly recommended radical revision of the federal airways system using radar as the basic component.

The recommendations were contained in a report on air navigation and landing aids by the aviation subcommittee headed by Rep. Carl Hinshaw (R. Calif.) filed with the House last week. The report is based on hearings that began last January and took testimony from every segment of aviation.

▶ **Urges Unity**—No sizeable appropriations can be expected for air safety facilities, the report indicated, until all domestic aviation interests agree on a single airways system that avoids costly duplications and will serve equally well for all types of civilian and military needs.

Primary blame for the current lack of co-ordination is placed squarely on CAA. The report cited "a strong note of hostility" that exists between CAA on one hand and other government and civilian agencies on the other caused by "a determination of CAA to dominate in important decisions." CAA also is accused of hamstringling effective functioning of the Air Coordinating Committee by using its veto powers to block action or force amendments incorporating its whims. According to the rules under which CAA operates, a unanimous decision is required for action.

"It is this process," the report concludes, "that may have engendered the duality in decision and, in important instances, excessive expenses under the federal budget."

▶ **Radar System**—The report proposed a system of radar airways, described in AVIATION NEWS last February, which is already under constructoin as a joint army-navy project. The system consists of radar beacons on the ground, search radar, airborne scope radar, GCA and airborne radar responders. The radar airways would be technically superior, more economical and a more valuable military asset than the VHF airways system now under development by CAA, according to the report.

Some novel approaches to financing the radar airway are offered. It is proposed that military appropriations be used to defray up to 75 percent of the cost of airborne radar to commercial airlines on the ground that addition of this equipment would provide a fleet of civilian transports ready for military use without modification expenses and delays.

▶ **Army-Navy Project**—A joint Army-Navy-airline project is currently working on development of standard lightweight airborne radar and has designed a 150 lb. airborne set that meets both airline and military requirements. Navy has already ordered 100 of these sets for installation in all its four engine transports, and American Airlines is expected to place a similar order soon.

Comparison of ground expenses show a radar beacon costs less than $10,000 compared to $90,000 for a VHF omni-range station with distance measuring equipment. The report points out that radar beacons and airborne radar will provide all the information obtained from an omni-range plus additional features of terrain clearance indication, anticollision information and thunderstorm warning.

The report also recommended that the commercial airlines pay for all omni-range and distance measuring equipment installations since they appear to be the sole beneficiaries of the system and that the expense of this system be removed from the CAA budget.

Among other recommendations:

• **ILS**—No further installations of this system should be made after the 98 sets in previous CAA budgets are installed. The report pointed out that the Navy has rejected ILS completely while the AAF feels that further development of the system in the VHF frequencies used by CAA is useless in view of the extreme reliability of beam landing systems using microwaves. A Sperry microwave landing system is being service tested at Washington, D. C., and Wilmington, Ohio, terminals of the AAF all-weather airline. AAF plans to use a beam landing system for automatic landings of its heavy aircraft.

• **GCA**—Present CAA program of operating modified AAF surplus GCA units should be abandoned because the equipment is obsolete for civilian purposes and its operation is expensive and its capacity limited. A program of installing the most modern fixed GCA units specially designed for commercial use should be substituted. Both Gilfillan Bros. of Los Angeles and Bendix Radio of Baltimore plan a $75,000 commercial GCA unit.

• **Approach Lights**—Bar neon lights should be installed where limits are 400 ft. ceiling and 1 mile or more visibility. Single string of medium intensity, controlled-output lights where visibility limits are less than one mile. Very high intensity approach lights with output controls where fog dispersal units are installed. Recommendation of the report regarding neon lights caused some astonishment since AAF, Navy, Air Line Pilots Association and Air Transport Association were unanimous in opposition

JATO KICK-OFF

Navy R4D (DC-3) with a 33,000 lb. gross weight is boosted off the deck of a carrier by four 1,000-lb. thrust JATO rocket motors made by Aerojet Engineering Corp. Just released, photo was made during recent Antarctic expedition, on which more than 40 JATO flights were made in one month. Six transports were used and equipped with slotted skiis, permitting wheel contact for initial carrier take-offs. Crosspiece attached to visible ski in photo is airfoil that prevents "whipping" of ski in flight.

to neon lights on the grounds that they were useless in bad weather. A joint committee recently wrote specifications for high intensity approach lights that are satisfactory to all parties concerned. Only CAA, which is installing neon lights, defended the equipment.

• **Mierowave Landing System**—Development should proceed with a beam landing system that promises to be satisfactory for fully automatic landings. The report cited AAF opinion that microwaves provide a straighter and firmer course, not subject to the deflections, bends and ripples found in the CAA VHF system.

• **VHF, Omni-Ranges**—The primary system of 459 fixed course VHF ranges authorized through fiscal 1948 should be installed as a substitute for the low frequency ranges now in use. These VHF ranges can be converted into omni-directional ranges at small cost. Since the omni-range with distance measuring equipment cannot be fully employed safely for multiple lane airways until an acceptable automatic traffic control system is developed and in use, it is recommended that this equipment be developed only on an experimental basis.

• **Air Traffic Control**—Funds should be made available to selected manufacturers for individual or joint experimentation, development and test of automatic means of indicating to ground personnel and pilots in flight formation on traffic separation in altitude, distance and direction. When approved, the new traffic indicating system should be installed on the basis of a predetermined program geared to reasonable expedition. Funds should be appropriated for a substantial service-scale test of the equipment.

• **Airports**—Studies should be made of each terminal area to determine the capacity of each airport under instrument flight conditions. Schedules should be geared and limited to the instrument operations capacity of the airport. If agreements on this cannot be reached with interested airlines, CAB should determine these capacities as a safety and economic measure.

Douglas Completes 50 DC-6s; 42 Deliveries

Douglas Aircraft Co. has completed more than 50 DC-6s, and had delivered 42 by the end of June, the company's semi-annual report discloses. During the second quarter of its fiscal year, which ended May 31, production rate on the DC-6 reached two and one-half per week.

Despite this beginning of deliveries of the DC-6, Douglas showed a larger loss in the second quarter of its year than it did in the first three months. At the end of the first six months of its fiscal year, net loss stood at $752,307, after tax carryback credits of $5,960,000, on sales of $54,534,370. At the end of the first three months, sales were $15,981,164, and net loss $107,109 after tax carryback credits of $700,000.

President Donald Douglas stated in the report that as deliveries increase, losses per plane will decrease and, before the end of the year, small profits should be realized on sale of each plane. But this point probably will not be reached soon enough to preclude a further rise in the net loss during the second half of the year.

At the end of May, Douglas backlog stood at $165,039,000, cut down sharply by second-quarter deliveries amounting to $38,553,000 while new business amounted to $3,054,000. At the start of the fiscal year, the backlog was $209,159,000, and dropped to $200,538,000 three months later.

Working capital remained fairly high at $58,151,182, with cash and government securities of $18,518,908 slightly above the first quarter figure, and inventories of $42,826,454 about 20 percent below the investment reported a quarter earlier.

New Rocket

North American Aviation may be expected to have already for firing by early fall its first Army-sponsored high altitude sounding rocket, the "Nativ." The rocket will be fired at Alamogordo, N. M., where a concrete launching base is being poured at this time. All that Army informants will say of the rocket is that it is designed for the study of "launching, servicing, aerodynamics, guidance, control, and handling characteristics of rockets." Indication that the rocket primarily is a research tool, rather than a tactical guided missile, is in the naming of it. "Nativ" stands for "North American Test Instrumental Vehicle."

House Lifts Limitations On Navy Plane Profit

Legislation removing the Vinson-Trammell Act's provisions requiring that 10 percent of Naval aircraft be procured from government-owned plants and setting a 12 percent ceiling on profits on Naval aircraft purchases was passed by the House.

The measure was approved last year by the House, but missed Senate action.

The 12 percent profit limitation on Naval plane orders, blocking negotiated developmental contracts, Rep. Paul Kilday (D., Tex.) reported to the House, "actually works to maximize, instead of minimize, profits on Naval contracts, since private manufacturers have come to accept the 12 percent limitation as the standard allowable profit." The navy will continue to procure the bulk of its aircraft under competitive bid contracts, Kilday said, but will have leeway to allow in excess of 12 percent profit on special contracts involving substantial developmental work under the Vinson-Trammell Act amending bill.

Under the bill, set for Senate approval unless precluded by a rush adjournment, the Navy would be required to manufacture its own aircraft in special instances—where the only aircraft company capable of fulfilling an order refused to offer what was deemed a fair price, or where there was evidence of collusion on the part of aircraft manufacturers to keep naval contract prices at an unjustifiably high level.

NAVION'S ARMY DRESS

Eighty-three Navions from North American Aviation's field inventory have been bought by Army for $662,672. Original purchase of 62 was increased recently by order for an additional 21. This now cuts to an even 100 planes NAA's still unsold Navions. Company hopes to dispose of these by November, when Ryan Aeronautical Co. of San Diego, purchaser of Navion design, gets into production.

Merger Faces Final Test in House Vote

Legislation merging the armed services into a national security organization with three co-equal subdivisions—Department of Army, Department of Navy, and Department of Air Force—was approved by the Senate on an overwhelming voice vote, with the outlook last week bright for speedy action in the House.

House Committee on Expenditures in Executive Departments concluded hearings, but it still appeared likely that a group in the House, led by Rep. Carl Vinson (D., Ga.), former chairman of the Naval Affairs Committee, would attempt to supplant the unification legislation with a measure establishing three separate armed services departments, loosely coordinated through a Presidential aide—the counter-proposal to unification of several ex-Navy department officers, including ex-Sen. Thomas Hart (R., Conn.), a retired admiral.

▶ **Three Departments**—Under the unification measure, the national security organization and its three departments for Army, Air, and Navy would be headed by full secretaries. Although only the over-all Secretary for National Security would have cabinet status, the three department secretaries would have direct access to the President, should they deem this necessary.

Armed services cooperation would further be promoted through legislative establishment of a Joint Chiefs of Staff, a War Council, and a Munitions Board.

The Joint Chiefs of Staff would consist of the chiefs of staff of Army, Navy, and Air Force, and the chief of staff to the President. The War Council would be composed of the Secretary of National Security, acting as chairman, and the secretaries and chiefs of staff of Army, Navy and Air Force. The Munitions Board, to coordinate civilian industrial capacity with national defense needs, would be headed by a presidentially-appointed civilian ($12,000-a-year compensation) and include an under secretary or assistant secretary from each of the three military departments.

In addition to merging the armed services, the unification measure also coordinates foreign policy and civilian mobilization with national defense by establishing a National Security Council and a National Security Resources Board.

Pogue and Leverone Will Head NAA Clinic

L. Welch Pogue, Washington, D. C., and Louis E. Leverone, Chicago, have been named co-chairmen of the executive committee of the National Aviation Clinic to be held in Springfield, Ill., Nov. 19-22. Pogue is chairman of the board of National Aeronautic Association, sponsor of the clinic, and Leverone is NAA councilor for Illinois.

PERSONAL AIRCRAFT SHIPMENTS

(Companies reporting to the Aircraft Industries Association)

	Number		Value	
	June	May	June	May
Aeronca	83	144	$162,000	$280,000
Beech	148	120	1,019,000	841,000
Bellanca	17	19	85,000	95,000
Cessna	143	256	325,000	571,000
Engineering & Research	45	112	116,000	290,000
Funk	2	N.A.	8,000	N.A.
Luscombe	130	184	328,000	437,000
North American	55	33	184,000	255,000
Piper	213	305	423,000	674,000
Republic	78	126	372,000	607,000
Stinson	224	319	972,000	1,385,000
Taylorcraft	..	1	.....	2,000
Total	1,138	2,002	$3,994,000	$5,437,000

N. A.—Not Available

Eastern Criticizes PCA's Management

The long-smoldering feud between Eastern Airlines and Capital Airlines (PCA) has burst out afresh, with EAL on the offensive.

In oral argument before CAB in the Middle Atlantic Area Case, EAL counsel E. Smythe Gambrell charged that PCA's current financial difficulties are of its own making and asserted that the large losses suffered by PCA are the result of reckless expenditures.

▶ **Profit Possible**—"If PCA had operated at Eastern's expense per revenue mile in 1946, as it could have done by efficiency, economy and frugality, it would have realized a profit in that year of over $4,000,000 instead of a $2,400,000 loss," Gambrell asserted.

With PCA's board of directors meeting last week, and with some sentiment for a change in management reported, Eastern's blast came at a particularly critical time. Earlier this month (Aviation Week, July 14), PCA had told CAB that it was "on the very threshold of bankruptcy, its working capital exhausted and its stockholders" equity "completely wiped out."

▶ **PCA Makes Report**—While not answering EAL's charges directly in the oral argument, PCA a few days earlier in a brief on a mail rate case had told the Board that its management was not only honest and efficient but economical to the point of niggardliness.

In response to a CAB order of last April asking why it was forced to depend increasingly on mail subsidies, PCA this month cited the short-haul nature of its system. The carrier said the granting of route extensions to Minneapolis, St. Paul and to New Orleans, together with the lifting of restrictions on existing links, would place it in a position to operate profitably.

▶ **Short-Haul Problem**—The report emphasized that as the nation's largest short-haul operator PCA had higher per mile expenses than other major airlines. It declared that PCA has to handle a considerably greater number of passengers than long-haul operators to get the same dollar revenue and cited figures to show that based on comparative yardsticks the company's costs are substantially lower than its competitors.

AIA Shelves Study Of Jet Sickness

Although many engineers of West Coast aircraft companies feel that all aspects of the high-frequency vibrations given off by jet engines should be thoroughly looked into, the budget meeting last week of the Aircraft Industries Association did not consider a proposed $16,000 grant to investigate "supersonic sickness" reportedly caused by the vibrations (Aviation Week, July 14.)

The research appropriation was recommended in March by a group of engineers who did some preliminary investigatory work and felt the fund would be in the nature of an insurance premium that would give the industry as a whole definite information on the matter. The research would have been undertaken by the Department of Aviation Medicine of the University of Southern California.

▶ **Manufacturers Reports**—Chief reason the supersonic sickness grant was not on the budget agenda were reports from engine manufacturers who expressed no apprehension.

The shelving of the proposal is a disappointment to engineers, who point out that practically no qualified data on the physical effects of ultrasonic vibrations exist, and the purpose of the suggested research was to determine whether their "suspicions" are valid or groundless.

Martin 202 Begins New Accelerated Service Tests

18,000 Mile Series of Flights to Mark First Transport Certification Under New CAB Requirement

By WILLIAM KROGER

First example of how the new accelerated service test for aircraft works out in practice got underway last week when Glenn L. Martin Co.'s 2-0-2 took off from Baltimore on an 18,000 mile series of flights which will take the plane from coast-to-coast and into nearly 50 airports as its final requirement for certification.

With its normal CAA tests completed, the 2-0-2 will be the guinea pig for the new requirement, which went into effect May 15 after a protracted wrangle between CAA, CAB and the aircraft industry. During the tests, which are expected to last for perhaps two weeks, the plane will be operated as nearly as possible according to airline standards and procedures, with about 10 hours of flying daily.

► **CAA Proposal**—A proposal for an additional amount of flight testing, following the usual certification tests, was originally circulated to the industry by CAB last fall. The theory was that the usual tests prove airworthiness, but not necessarily the ability f the aircraft to function properly and reliably during routine operations. It was proposed that transport-type planes be required to fly 150 hrs. of service tests, and non-transport types 100 hrs.

The manufacturers objected on the grounds that the sole effect of the regulation would be a delay in certification and delivery of airplanes; that the time specified was too short for all "bugs" to show up; and that "safety is a continuous process" that could not be guaranteed merely by adding hours of test time to an airplane.

► **CAB Order**—Despite these objections, CAB went ahead and without a public hearing issued the new regulations to take effect Mar. 15. This caused further protests from the industry, which were partly responsible for an extension in time of the effective date to May 15. Since then, CAA has been laying down procedures for the service test, and the 2-0-2 is the first airplane to come up for certification under the requirement.

The accelerated service test program, as detailed in CAA Safety Regulation Release 243, sets up 150 hr. for transport types and 40 to 150 hr. for non-transport, depending upon complexity. On other features of the program, the Safety Release lays down broad specifications which will be followed by CAA's regional staffs who will have the responsibility for carrying out the tests. The 2-0-2 tests are being run under supervision of CAA's Region I with headquarters in New York.

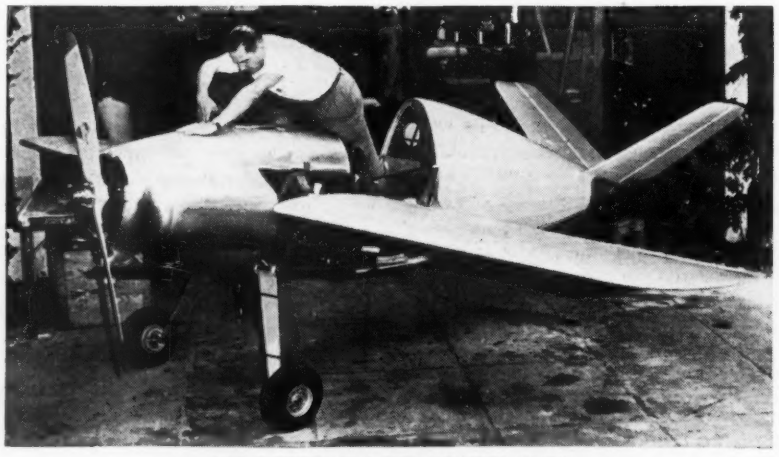
► **Insurance Rates**—Whether it will be the standard practice or not has not been determined, but Martin is conducting the service tests under NX insurance rates, one of the aspects of the new requirement that originally worried manufacturers. At least one effort was made to persuade insurance companies to carry the additional hours of testing at NC rates, inasmuch as the time would be put in after the airplane completed —and presumably passed—the normal tests for an NC certification.

CAA regional offices are permitted to give an allowance to the manufacturer for time built up by an airline flying the type of plane under test. Due to this, the 2-0-2 that last week left Baltimore May not have to fly the full 150 hr., as Northwest Airlines has been doing extensive flying with another plane.

The plane that started its tests last week will hit approximately 35 airports in flights planned to bring it back to Baltimore after about eight days. It will then get a check before starting again on an itinerary that will take it to the west coast.

► **Inspections Scheduled**—Each day a complete inspection will be made of the plane, to check service, corrosion, malfunctioning, adjustment, repair, replacement, etc., of key parts. This will include recording such data as engine, airframe and propeller time each day, together with a "condition and security" report daily on fuselage, wings, controls, fuel system, oil system, hydraulic system, power plant, landing gear, propeller, electrical system, instruments, equipment, anti-icing, fire detection, and oxygen supply.

Complete reports will be filled out after each flight, with each take-off and landing being considered a flight. About ten such flights will be made a day. These flight reports will include: weather; gross weight; center of gravity; take-off conditions; power settings; cabin heater on or off; anti-icing (must be turned on every third flight); use of electric, radio, heating and ventilating systems; single-engine performance; landing gear operation; flap operation; generator loads; stall characteristics; landing performance; single-engine go-round performance.



TROPHY RACE ENTRANT

Art Chester works on his entry for Goodyear Trophy Race at National Air Races, next Labor Day. 'V' tailed midget weighs 520 lb. empty, has 70 sq. ft. wing area, a 15 gal. fuel tank. Powered by a C-85 Continental it boasts top speed between 190 and 200 mph. Costs about $5,000.

New Training Plan

Augmenting its inter-American aviation training program for the schooling of Latin Americans in airways operation and maintenance, CAA is sponsoring a new program under which aviation officials of Latin American countries will study government and private aviation in the U. S.

Gregorio Bisquertt, Chilean national director of aviation, already has arrived in this country at the head of a delegation, following arrangements made by CAA liaison officer Theodore C. Uebel. Delegations also will come from Arginetina, Bolivia, Colombia, Ecuador, Mexico, Peru and Uruguay. German Pol, Bolivian director of aviation, was trained as a mechanic in the first inter-American program of 1942.

In addition to the program for Latin Americans, CAA at present is training 50 students from the Philippine Islands. All instruction is given at CAA's Oklahoma City center.

Aerial Mapping

As a joint Coast Guard-Coast and Geodetic Survey venture, the Alaskan coast line is being mapped this summer with a Boeing B-17 equipped with a Fairchild-built, nine-lens camera. The plane will cover the entire coast, from the Gulf of Alaska to the Arctic Coast adjoining Canada, including the Aleutian Islands.

AVIATION CALENDAR

July 22—AIA Helicopter Council meeting, Washington, D. C.
July 22-24—AIA Engine, Propeller, Accessories and Equipment Technical Committee meetings, Hotel Lexington, New York
July 31-Aug. 1—AIA Eastern Regional Traffic Committee meeting, Hotel Schroeder, Milwaukee.
Aug. 1-2—Parks College reunion, 20th anniversary, East St. Louis, Illinois.
Aug. 7-8—Annual Summer meeting, Institute of the Aeronautical Sciences, Los Angeles.
Aug. 7-8—1947 convention, National Flying Farmers Association, Oklahoma A & M College, Stillwater, Oklahoma.
Aug. 13—CAA-Sponsored State Aviation Forum, Nashville, Tennessee.
Aug. 16-17—Oakland Air Show, 20th anniversary of Dole Flight, sponsored by Junior Chamber of Commerce, Oakland, California.
Aug. 19—ICAO meeting, Airdromes, Airways and Grounds Aids Division, Montreal.
Aug. 21-22—West Coast Transportation and Maintenance meeting, Society of Automotive Engineers, Biltmore Hotel, Los Angeles.
Sept. 6.—Anglo-American Conference, Institute of the Aeronautical Sciences and Royal Aeronautical Society, London.
Sept. 8-12—Second annual conference and exhibit, Instrument Society of America, Hotel Stevens, Chicago.
Sept. 15-17—Air Force Association, first annual convention, Columbus, Ohio.
Sept. 16—ICAO meeting, Radio and Communications Division, Montreal.
Sept. 16-18—Second Regional CAA conference, Atlanta.
Oct. 2-4—Autumn Aeronautics meeting, Society of Automotive Engineers, Biltmore Hotel, Los Angeles.
Oct. 3-4—Arizona State Aviation conference, Douglas, Arizona.
Oct. 8—ICAO meeting, Meteorological Division, Montreal.
Oct. 15-18—Montreal Board of Trade, 2nd annual air conference, Montreal.
Oct. 20—Air Industries and Transport Association of Canada, annual meeting, Gray Rocks Inn, St. Jovite, Quebec.
Oct. 24-26—"Air Day in Texas" avation show, Harlingen, Texas.
Oct. 26-28—National Association of State Aviation Officials, Fort Worth, Texas.
Nov. 4-7—National Airport Show and Institute, sponsored by Air Foundation and National Aeronautic Association, Municipal Auditorium, Cleveland, Ohio.
Nov. 6-7—Fuels and Lubricants meeting, Society of Automotive Engineers, Hotel Mayo, Tulsa, Oklahoma.
Nov. 19-22—Fifth annual National Aviation Clinic, Springfield, Illinois.
Dec. 1-3—Air Transport meeting, Society of Automotive Engineers, Hotel Continental, Kansas City.

Bell Names British Dealer

Irvin-Bell Helicopter Sales, Ltd. of Letchworth, Herts, England, has been designated as the fourth foreign dealership in Bell helicopters, by the manufacturer, Bell Aircraft Corp., Buffalo. Franchise of the new company, headed by Leslie L. Irvin, president of Irving Air Chute Co., Inc., Buffalo, includes the entire British Isles, including Eire and the Channel Islands. Capt. Alan B. H. Youell and Wing Commander Noel J. Capper, graduates of Bell's helicopter pilot training school, will be pilots for the new dealer and have supervised delivery of the first Bell Model 47B to England. Future deliveries will be mainly concentrated in the utility helicopter, for agricultural and airmail use.

New Mitchell Bill

Legislation to restore the rank of Major General to the late Col. "Billy" Mitchell, demoted for his aggressive advocacy of a strong separate air force, was cleared last week by the Senate Armed Services Committee.

Perennially sponsored by Sen. Alexander Wiley (R.) of Mitchell's native state of Wisconsin, the measure has been passed by every Senate since 1940, only to be killed off in the House. The War Department declined to give the Senate committee its position on the Wiley bill—which not only would honor Mitchell, but would be tantamount to a reprimand to the department which demoted him.

Last year, Wiley succeeded in getting enacted a resolution posthumously awarding a Congressional Medal of Honor to Mitchell.

Caterpillars Organize

The Caterpillar Club has launched an organizing campaign for local chapters under the direction of Leo A. Smith, acting secretary. The club was formalized by its members two years ago following many years of existence as an informal group. Membership is available to any person who has "bailed out" of an airplane in emergency and those qualified are urged to obtain application blanks from the Caterpillar Club, Broad Street Bank Building, Trenton, New Jersey.

CAA Approves JATO For Transport Power

Following up its certification some time ago of a JATO unit, CAA has approved the use of JATO motors on airline DC-3s and DC-4s as emergency power.

Officials of Aerojet Engineering Corp., manufacturers of the rocket motors, declare that the effect of the ruling will be to permit the use of marginal runways by these transports without sacrifice of gross payloads.

CAA, however, points out that its approval is only as an auxiliary safety device, and that the use of JATO cannot be figured in the computation of take-off distance. The motor will be used only in event of power failure on take-off.

Aerojet will conduct new JATO tests at its Azusa plant to determine the time that JATO units can be exposed to extremely low temperatures without affecting the motor's solid fuel propellant. Company officials anticipate that the CAA will allow a JATO unit to be carried, as stand by power, for 100 flying hours before replacement by a freshly-charged motor.

The transport-type JATO motor (Models D-4 and D-5) sells for $185 and is reloaded by the manufacturer for $125. Aerojet estimates that in overall operating costs of a transport such as the Convair 240 the addition of JATO can be had for ½-cent per mile and that in operating from high-altitude airports, such as at Mexico City, the cost will be more than compensated by a gain of 2000 lbs. in payload.

New Contract Bill

Legislation authorizing the War and Navy Departments to negotiate contracts, under special circumstances, was cleared by the Senate Armed Services Committee last week. The measure already has passed the House. It would permit the services to negotiate research and development contracts for supplies with characteristics which should be kept secret in the interests of national defense, and contracts for standardized parts.

PORTSMOUTH FLIES AEROCAR PROTOTYPE

This five-place passenger plane also seen as adaptable for light cargo carrying in feederline operation, has twin boom construction similar to Fairchild Packet. Craft is powered by two Cirrus Major III 150-hp. engines driving fixed pitch wooden props. Whereas prototype embodies composite wood and metal construction, production models will be all-metal. ("Aeroplane" photo.)

FINANCIAL

Lockheed Subsidiaries Increasing Profitability

Service unit expansion will contribute to earnings of parent company; Constellation program provides broader base for charging off development costs.

Recent Navy award of an additional contract for modification of aircraft to Lockheed Aircraft Service, Inc., focuses attention on the importance of the various subsidiaries to their parent, Lockheed Aircraft Corp. While the parent company, in common with other aircraft builders, is finding it difficult to show current earnings, its subsidiaries are showing an increasing degree of profitability.

Lockheed Aircraft Service, Inc. was formed earlier this year to service and maintain all types of equipment. It previously received a Navy modification and maintenance contract for 90 planes amounting to $3.5 million This recent contract aggregates $7.2 million and covers 124 planes. It is estimated that this will assure continuing operations up to December, 1948. Currently, the service unit also holds important modification contracts with the Army and commercial operators. An incidental advantage to the parent company is present in that it is relieved of rendering free modification service to Constellation operators. The service unit, with major bases at Burbank, California, New York, and Shannon, Eire, is in a position to expand its activities to major proportions and contribute importantly to the earnings of its parent.

▶ **Pacific Important**—Another profitable subsidiary of Lockheed Aircraft Corp. is Pacific Finance Corp. This unit is entirely dissimilar to its parent's main activity. This subsidiary is confining itself to the financing of automobiles and other items not related to the aircraft industry. During 1946, Lockheed increased its holding in this subsidiary by the purchase of 57,400 additional shares bringing its total holdings to 294,537 shares or about 95 percent of the total. The total cost of this investment is $5,039,389. However, Lockheed's equity in the net assets of the finance company as of December 31, 1946, was $5,203,692.

Reliable sources indicate that the finance company's earnings for this year may contribute around $500,000 or 50 cents per share on Lockheed's stock.

Lockheed Air Terminal, Inc., another subsidiary, continues to operate profitably despite the removal of many of the airline schedules to the newly enlarged and improved Los Angeles Municipal Airport. This loss of passenger schedules has been somewhat offset by the addition of two of the nation's largest cargo carriers to the area. In view of the great population center represented by Los Angeles, it is believed that sufficient traffic is available to support two major airports. On this premise, Lockheed Air Terminal may be expected to maintain its profitability.

▶ **Airquipment Profit**—Another subsidiary, the Airquipment Company, which was organized in 1945 showed a profit in 1946 and holds promise of doing the same this year. This subsidiary is engaged in the development, manufacture and distribution of a complete line of ground handling equipment and tools for all sizes and types of aircraft and aircraft equipment.

Lockheed Aircraft Corp. in its own operations is believed to have passed through the most difficult phase of its transition and is approaching the point where much better results may be anticipated. During 1946, the company showed a net operating loss of $21,859,374. However, tax credits and special reserves converted this deficit to a reported net profit of $3,058,785. It is believed that the company will show a loss of a few million dollars for the first half of this year. Lockheed is in the process of effecting the acquisition and transfer of various properties with the government which may result in major accounting profits.

In order to finance its Constellation inventory position, the company incurred a total of $40 million in bank loans. This is in the form of a $30 million bank credit which runs to December 31, 1948, and $10 million in serial notes. It appears that the company will not be forced to do additional financing and the bank loans will most likely be liquidated on or before maturity.

Hand in hand virtually with the bank loans is the inventory position. As of March 31, 1947, such inventories aggregated around $60 million. This inventory position will be reduced as increasing deliveries of the Constellations are made.

▶ **Program Increased**—It is reported that the total Constellation program has been increased by 29 planes to a total of 173. This provides a broader base against which to charge development costs. The company produced 73 of the first type of Constellation and 71 of the improved "Gold-Plate" model. The entire group of the first type have been sold. About 25 of the newer version remain unsold but recent developments augur well for their ultimate disposition.

Lockheed has a substantial military backlog which should assure high volume activity well into 1948. However, a continuing aircraft procurement program is necessary if sustained earnings are to be shown. With increasing official sentiment for a planning board to implement long-range aircraft development, Lockheed may again be expected to take its place in the first line of national defense.

Stock Transactions Show New Confidence

For the first time this year, aviation officials appear to favor purchase of their own securities. This trend is revealed in the summary of transactions for May as released by Securities and Exchange Commission.

Coming when both phases of the industry are in the doldrums, this is the best evidence of confidence in the group and its survival by its officials.

▶ **Rockefeller Holdings**—L. S. Rockefeller bought 100 shares of Eastern in May. This was followed up with a subsequent purchase of 5,000 shares, which brought his total holdings to 45,000 shares.

It also is noteworthy that William Piper was a consistent purchaser of Piper 4½ percent preferred throughout April and May, acquiring a total of 1,600 shares of this series, bringing his total holdings to 3,350. Piper also was reported as owning 166,276 shares of common or about 23 percent of the total issue.

▶ **Lochiel Acquisitions**—An interesting series of transactions is revealed in belated reports made by Raymond G. Lochiel of PCA. During 1946 he exercised various options to acquire a total 425 shares of common stock, augmenting his holdings to 935 shares. He also was reported to have purchased 4,000 of the company's debentures in September, 1946.

In another belated report, Alfred Marchev, former president of Republic Aviation Corp. discloses the sale of his entire holdings of 750 shares in February, 1947.

▶ **Additional Dealings**—Other significant transactions reported:

	Month	Bought	Sold	Total Holdings
American Airlines				
Amos Culbert	April	800	....	800
Lockheed Aircraft				
Cyril Chappellet	May	....	300	6,154
North American				
J. S. Smithson	May	100	....	100
Northrop Aircraft				
Gage Irving	May	....	1,600	2,900
" "	April	....	500	4,500
Northwest Airlines				
R. O. Bullwinkel	May	....	150	none
Western Airlines				
Charlie N. James	May	....	291	4,339

Allison Turbo-Jet Production Indicates Impressive Potential

Largest volume maker of J-33 and J-35 engines could easily multiply present rate many times.

By ALEXANDER McSURELY

Two impressions are outstanding to the observer who visits the Allison jet aircraft engine plant in Maywood, Indianapolis suburb, where the General Motors Division is turning out the engines at a varying modest rate of around 100-150 a month:

▶ **The Allison operation** is the largest mass production of the new type power plants which have revolutionized aviation in the last few years, and probably the only jet engine assembly line production in the world.

▶ **The production potential** of the huge war-built 45-acre plant, with long rows of machine tools, if far more impressive than its present rate.

Approximately 3,000 of Allison's 7500 employes are working on jet engines. But the production could be multiplied many times if more materials and manpower were used by continuously manning presently available machine tools, which are working to only a small fraction of their capacity.

An Allison visit made several years ago at peak of production on 1600 hp V-1710 reciprocating engines, with approximately 20,000 employes, offers an interesting contrast with the current production setup.

Peacetime Allison employes are still making V-1710s, now rated at 250 hp, as power plants for the North American P-82E twin Mustang long range escort fighter, producing them at the rate of approximately 80 a month, so that total Allison production on aircraft engines runs over 200 a month. Besides its aircraft business, the division is making shock absorbers for GM autos, hydraulic lifts, diesel engine blowers, transmissions and engine bearings.

Simplicity of the V-1710, which had approximately 7,000 parts, or about 700 piece parts which are unduplicated, was something for Allison to blow its horn about back in the war days. But now it is estimated that the number of piece parts in either the fat J-33 rotary compressor engine or the axial flow J-35 is about half the number in the reciprocating engine.

Engineers at the Indianapolis plant have had engineering responsibility for the J-33 engine (originally the General Electric I-40 design) for approximately 20 months. During that period it has been redesigned part by part for higher performance and greater efficiency in mass production. The Allison model 400, which has the latest J-33 refinements, powered the Lockheed P-80-R fighter which set a new world speed record of 623.8 mph last month.

At the time of our visit, June 27, Allison was making 141 different parts and sub-assemblies for the J-33, performing a total of 3151 operations in the manufacturing and assembly of the engine, in addition to parts made and operations performed by sub-contractors.

Allison has had a contract to make the J-35 axial flow engine (also known as General Electric's TG-180) for less than a year, and has not progressed so far in production of this product. The Indianapolis plant makes some 26 J-35 parts and sub-assemblies besides those purchased from outside sources. Thompson Products, Cleveland, and Timken Roller Bearing Co., Canton, Ohio, are two of the most important sub-contractors. Thompson's contribute to the J-35 includes the rotor, stator and turbine wheel, while Timken also contributes to the turbine wheel.

Extensive use of magnesium castings in the J-33 are noted in the production line. One interesting casting made by Dow is a large diffuser ring which directs air into the 14 combustion chambers. Each of the 14 outlets has four steel vanes, to direct the air, which are cast integrally with the magnesium which surrounds them.

Irregular flow of materials and parts is a major production problem, probably augmented by the relatively small volume of production. In many cases it has been found more efficient to rework parts rather than to send them back for replacement.

Spin tests are used to prove the compressors and the turbine wheels before they are assembled into the J-33s. The compressor must withstand a spin of 14,100rpm while the turbine wheel without blades is whirled at 19000rpm and then after the blades are attached, it is whirled again at 14500rpm. Takeoff rpm for the J-33 is 11,500 leaving a considerable margin.

Like reciprocating engines, all the J-33s and J-35s have "green" runs on a test stand, and then are torn down, inspected for flaws, rebuilt and put back on the stands for final test runs. The J-35 gets a 2.7 hr. green run, and a final run of 1.2 hrs. after teardown and inspection. The J-33 has slightly longer tests, a 3.7 hr. green run, and a 2.5 final run.

The eight Allison test cells used for the

L-13 ASSEMBLY LINE

Appropriately, there are 13 stations in final assembly line for Consolidated Vultee L-13 liaison plane at San Diego Convair plant. (Two more stations in addition to the 11 shown in the picture.) The 240-hp. plane is designed for quick conversion into two-litter ambulance or light cargo plane, as well as for primary military uses of observation and communication.

jet engines have just undergone a new soundproofing treatment as a result of complaints by Indianapolis residents after production on the J-35 began, and the J-35 was run in the test cells. Additional acoustical treatment and muffling devices have subdued the J-35's shriek considerably.

Allison has military contracts for over 1,000 of the J-35s, in addition to its J-33 contracts on which it has already delivered more than 2,000 engines.

Currently the latest J-33 engine is well ahead of the J-35 in powerweight ratio, but Allison engineers expect the axial flow turbojet, which theoretically is more efficient, to pass the centrifugal flow engine, provided development of both engines is conducted at approximately the same rate.

The J-33-21 production engine is rated at 4500 thrust lbs. with water injection, or 3825 lbs. dry. The later model 400 is rated at 4600 lbs. dry, and on the basis of approximately 20 percent increase in power with water injection, might be expected to do close to 5500 lbs. thrust.

The J-35 engine is currently rated at around 3750 thrust lbs.

McDonnell Earns Profit

McDonnell Aircraft Corp. earned a profit in the fiscal year ended June 30, the company reports in announcing that it has paid off all its bank loans, amounting to $1,296,000. Size of last year's profit was not disclosed pending release of the annual report.

Since organization in 1939, the company has earned a profit every year with the exception of the fiscal period ended June 30, 1945. Company backlog at the end of April this year was $24,000,000, equal to two years of work. This will be boosted to $42,088,381 when the new F2D-1 Banshee goes into production. (It has been indicated previously that the Banshee order will involve approximately 60 airplanes.)

Current backlog is two-thirds for Navy research and production of the BD-1 Phantom and one-third Army.

Mach Meter for Jets

A new instrument, the Mach Meter, is rapidly becoming one of the critical flight instruments for high performance jet aircraft. Now standard equipment on U. S. production jet fighters, the instrument keeps the pilot informed on the safe speed limit of the airplane under existing conditions of altitude and temperature. When combined with the conventional airspeed indicator, the instrument contains two pointers which provide the pilot with an indication of the speed he has to spare before encountering compressibility difficulties.

Since the speed of sound varies with temperature, which, in turn, varies with altitude, the instrument contains both a pressure diaphragm and a bi-metal strip.

Special mach meters of extreme accuracy are used for research purposes, both in wind tunnels and in flight research airplanes such as the XS-1 and D-558.

Industry Observer

► **Navy is pressing research on an entirely new type of aircraft engine. This power plant was developed under wraps in wartime Germany and differs radically from others in operating principles.**

► Next new AAF fighters to take the air will probably be North American's single jet P-86 and Curtiss-Wright's four jet, P-87. The P-86 is designed to hit better than 630 mph with a single TG-180. The P-87 is designed for use as an all-weather fighter and will be powered by four Westinghouse 42C jets giving it a rated speed of better than 620 mph at low altitudes. Both planes will have pressurized cabins and pilot ejection seats.

► **Careful airplane "rubdown" may be a prime duty for ground crewmen on jet fighters. Recent NACA research on a new highspeed air foil indicated that dust clinging to a fingerprint on the wing can change airflow from laminar to turbulent characteristics.**

► Goodyear has a new Navy contract for engineering data on a new-type rigid airship.

► **Modification of a Grumman Widgeon by Edo Aircraft Corp. to incorporate a NACA planing tail hull is scheduled for November completion. Navy has provided the airplane.**

► AAF's high speed jet bomber series (XB45-48) are considered so fast that they carry armament only in the tail—a pair of .50 cal. machine guns.

► **AAF has made eight flights to the North Pole on its long range Arctic weather reconnaissance program.**

► Wright Aeronautical is making rapid progress on development of compound reciprocating engines (supercharger geared back to engine crankshaft) ramjet, turbojet and gas turbine engines.

► **Consolidated Vultee has suspended its interest in flying wing development after AAF cancellation of a contract for the XB-53, a giant flying wing type bomber.**

► Bell Aircraft Corp. will shortly deliver two R-13 type helicopters to the Navy, whose interest in helicopters is rapidly expanding.

► **Look for airlines, confronted by prospects of reduced gross weights for take-offs, to press for CAA approval of jato units for emergency take-off power. Reverse jato units are also being developed as landing brakes.**

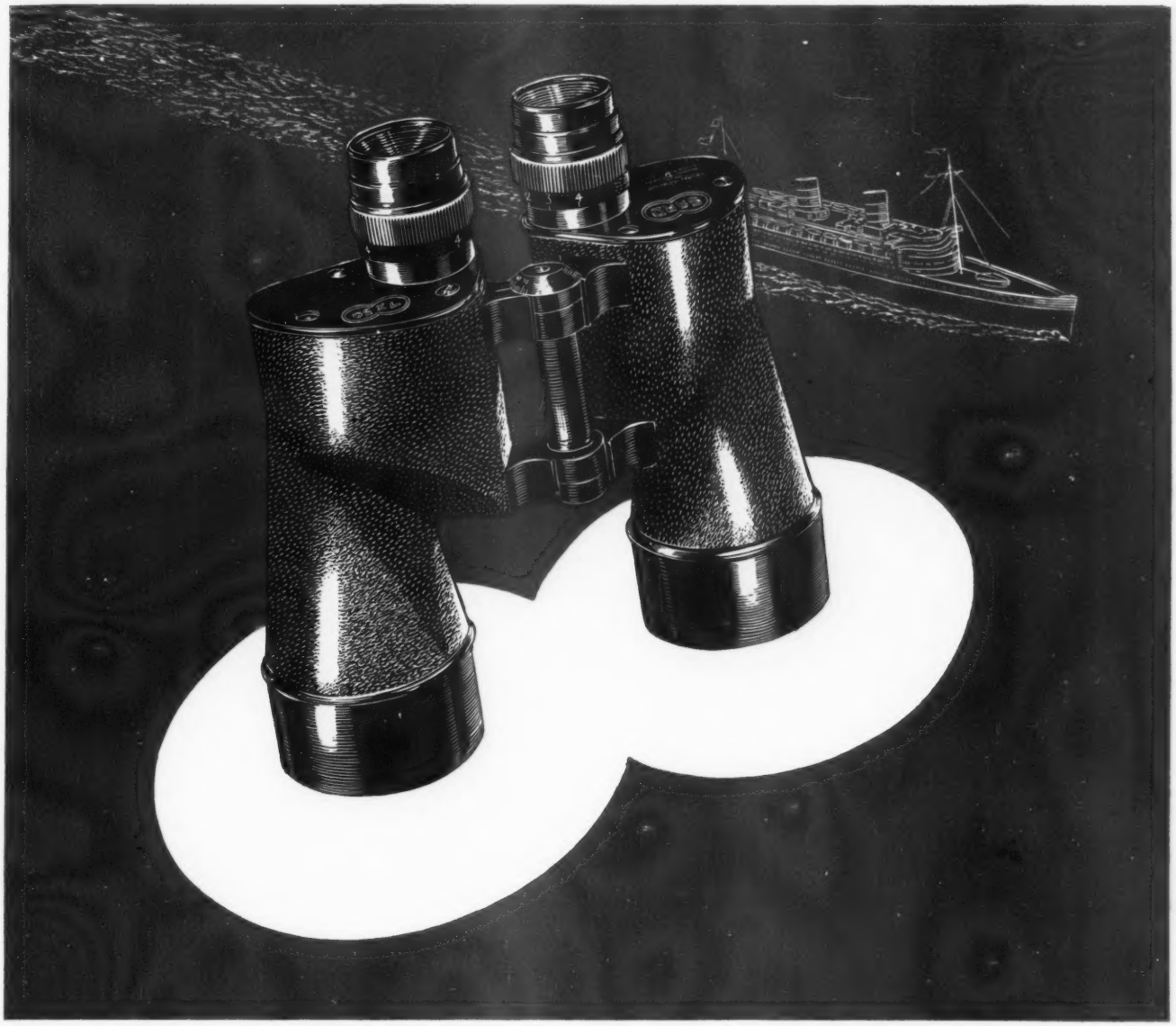
► British have sold the Dutch Navy their Firefly Mark IV fighter.

► **Three Short Sandringham flying boats ordered by Norwegian Air Lines have been equipped with scope radar, radar altimeter and a Rebecca-Eureka radar system.**

► Airborne scope radar will have to be modified by addition of a special terrain clearance warning indicator to be acceptable under the new civil air regulation requiring terrain clearance warning indicators on all commercial transports by Jan. 1, 1948. Such modifications can be made easily.

► **The Martin XB-48 is back at the Baltimore plant following its first takeoff flight, which ended at N. A. S. Patuxent. The return flight was uneventful. Future test flights will take place at Martin.**

► McDonnell XF2D-1 Banshee is undergoing flight tests at AAF's Scott Field, Belleville, Ill., while runway work is being completed at the St. Louis Airport.



Binoculars by Kollsman

Unknown to many, the design and manufacture of precision optical devices has been an important part of Kollsman production for several years. Among the products of which we are particularly proud are the Kollsman Sard 7 x 50 Navy Type Binoculars. Incorporating many new design features not previously included in binoculars, this unit proved itself to be outstanding in performance both during the war and since. Another Kollsman optical achievement is the optical drift sight. Soon to be released are other outstanding contributions in optics to the aviation industry, such as the new periscopic aircraft sextant. A new departure in binoculars for personal use is also being introduced.

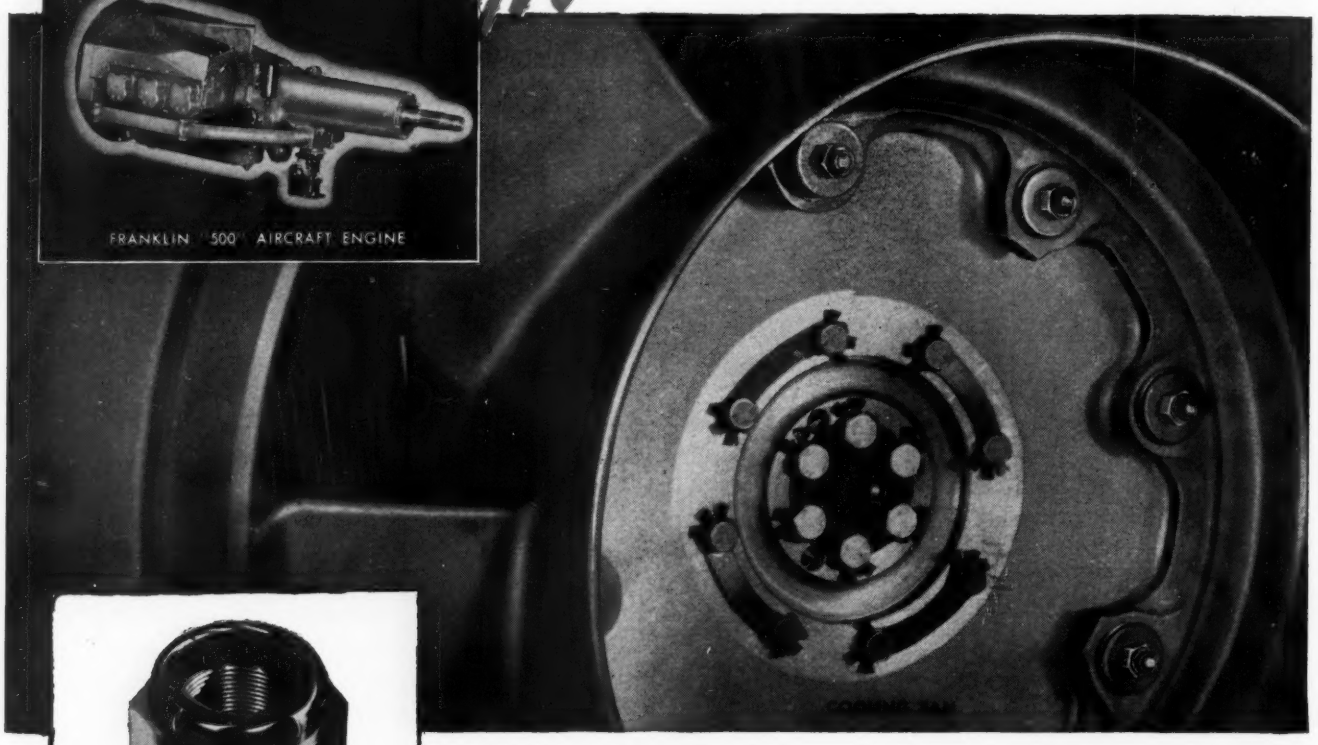
KOLLSMAN INSTRUMENT DIVISION

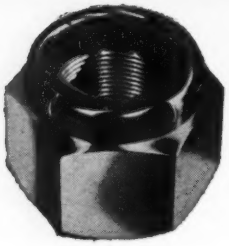
SQUARE D COMPANY

ELMHURST, NEW YORK • GLENDALE, CALIFORNIA

RUBBER *Flexible Mounts* **WHIRLING AT 2,500 RPM**

FRANKLIN "500" AIRCRAFT ENGINE





LOOK FOR THE RED COLLAR
THE SYMBOL OF SECURITY

It is threadless and permanently elastic. Every bolt — *regardless of commercial tolerances* — impresses (does not cut) its full thread contact in the Red Elastic Collar to fully grip the bolt threads. In addition, this threading action properly seats the metal threads—and eliminates all axial play between bolt and nut threads.

All ESNA Elastic Stop Nuts — *regardless of size or type*—lock in position anywhere on a bolt or stud. Vibration, impact or stress reversal cannot disturb prestressed or positioned settings.

—yet the Red Elastic Collar locks each positioned setting against VIBRATION!

Here's an interesting detachable fastener problem: Bolting an eleven pound cooling fan assembly to the fly wheel of a 215 HP Franklin Aircraft Engine. The connections are rubber mounted to inhibit the transmission of engine vibration or impulses to the fan and conversely inhibit the transmission of fan flutter and unbalance back to the crankshaft. The proper fasteners must be self-locking without any frictional aid from bolt tension or seat pressure because the rubber mounts will flex constantly.

The solution is the ESNA Elastic Stop Nut—with its self-locking, self-sealing Red Elastic Collar. It locks in position anywhere on a bolt or stud. It provides permanent protection against Vibration, Corrosion, Thread Damage, Liquid Seepage, and Costly Maintenance. Elastic Stop Nuts are available for maintenance and new equipment. ESNA engineers are ready to study your fastener problems. Address: Elastic Stop Nut Corporation of America, Union, N. J. Sales Engineers and Distributors in principal cities.

ESNA

ELASTIC STOP NUTS

INTERNAL WRENCHING

ANCHOR

INSTRUMENT MOUNTING

SPLINE

CLINCH

GANG CHANNEL

CAP

PRODUCTS OF: **ELASTIC STOP NUT CORPORATION OF AMERICA**

Shockwave Tube New Research Aid

A new device for fundamental research in compressibility phenomena is now in operation at the University of Michigan under an Office of Naval Research contract. It consists of an eight-foot pipe divided into two compartments separated by a cellophane diaphragm.

Compressed air is pumped into one section and piercing of the diaphragm by a plunger releases the compressed air which travels as a shock wave front down the pipe and past an airfoil model located at the opposite end. An electrical spark is released near the test model and a camera mounted outside a window photographs the impact of the shock on the airfoil.

Value of the device as an aid to fundamental shock-wave research lies in its projection of a shock wave against a model airfoil, whereas in a conventional supersonic wind tunnel the model creates its own shock wave. Research data developed by this method would provide design data for supersonic wing design in which a conical shock from the nose of the airplane or missile intersects the wing leading edge. It would also provide information for internal flow systems in which normal shocks intresect air intake throats and internal units.

Dr. Lincoln G. Smith, in charge of the experiments, foresees applications of the device to general aeronautical research fields.

MIT Posts Split

Dr. Jerome C. Hunsaker, head of the departments of mechanical and aeronautical engineering, Massachusetts Institute of Technology, will be able to devote more time to directing MIT's aeronautical research as result of appointment of Prof. C. Richard Soderberg as head of the mechanical engineering department. One of the major activities of Dr. Hunsaker's department will be operation of the new supersonic wind tunnel now under construction for Navy research.

Fokker Promoter Beats Performance Estimates

Completion of test flight program of the Fokker Promotor (See AVIATION'S YEARBOOK, March 1947 for specifications) indicates the craft has bettered predicted performance figures as production of the four-placer begins.

Top speed has proved to be 140 mph., against predicted top of 135; cruising at 3,300 ft. is 127 instead of forecast 121; and range is 630 instead of 575.

Gross weight has gone from estimated 2,980 lb. to actual 3,150 and empty weight has dropped from estimated 2,120 to 2,030 lb. wing loading thus comes out at 15.9 lb. per sq. ft. instead of predicted 16.3 and power loading is actually 15.71 instead of 16.6 lb. per sq. ft.

Briefing Production News

► **Aircooled Motors, Inc.** has received new AAF contracts totaling more than $1,000,000 for the 245 hp Franklin engines for Consolidated Vultee's L-13. Orders include spares and overhaul tools and fixtures. The contracts offset somewhat cutbacks in civilian plane order.

► **Cessna Aircraft Co.** has been awarded a $6,500,000 Army contract for special "tropicalized" furniture made of fungus-resistant wood and metal. At least part of the work will be done in Cessna's Hutchinson plant.

► **Continental Aviation & Engineering Corp.** has research and manufacturing contracts totaling $4,539,639.

► **Salsbury Motors, Inc.,** subsidiary of Northrop Aircraft, has nearly doubled its production rate on its motor scooters. Present objective is daily output of 60 of the two-wheel vehicles.

► **United Service for Air, Inc.** has eight C-46 A's and D's in various stages of conversion at its Niagara Falls Plant, in addition to considerable parts and components under fabrication.

► **McDonnell Aircraft Corp.** is scheduled to open this week a service school for training Navy personnenl in maintenance of the FD-1 Phantom. Total of 60 men will be trained in three one-month courses. A production model Phantom will be used in the instruction.

► **Lockheed Aircraft Service, Inc.'s** Navy contract for maintenance and overhaul of R5D and R-50 transports has been raised from $3,500,000 for 90 airplanes, to $7,200,000 for 124 planes, all work to be done at the Burbank base. Contract of the MacArthur Field, Long Island, base with Air Transport Command for heavy maintenance on 17 C-54's has been extended through Aug. 30.

► **Pacific Airmotive Corp.** will convert and modify all carburetors on DC-6's to be used by Braniff Airways. Braniff is the 56th airline PAC has served this year.

► **Curtiss-Wright Corp.'s** Columbus Airplane Division now has Navy contracts aggregating $8,250,000 for overhaul of 36 Commandos and 76 R4D's, and for production of spare parts for Helldivers, Seahawks and Commandos.

► **Boeing Aircraft Co.** instructed 41 AAF personnel in maintenance and servicing of the new B-50 bomber in a specialized two-week course. These men will conduct AAF's own maintenance training program on the plane. Company is operating a school at Seattle for airline pilots and mechanics to familiarize them with stratocruiser.

► **Piasecki Helicopter Corp.** has completed moving into its new, half-million dollar plant at Morton, Pa.

► **SKF Industries, Inc.** has announced a two-year, $4,000,000 modernization and re-equipment program for its two Philadelphia plants primarily to step up production of spherical roller bearings, of which it claims it already is the nation's largest manufacturer.

► **Aerojet Engineering Corp.** has made a blanket wage increase of six and one-half cents an hour for factory employees and five and one-half for office and technical employees, both raises retroactive to May 26.

► **Consolidated Vultee Aircraft Corp.** next month will deliver its number two model 240 under an NX category, to American airlines.

Bendix Develops New Jet Starting

A new turbojet engine starting system, which eliminates the damaging effects of conventional "hot start" systems, has been announced by Bendix Aviation Corporation. The system prevents the passage of flame through the turbine and out the tailpipe, thereby preventing warping and buckling of the combustion chambers and turbine blading and "thermal shock" to ceramic coatings.

The starting system of the J-33 turbojet engine, for example, consists of introducing fuel into the 14 combustion chambers and energizing starting plugs in two of them. The flames in these two "cans" then spreads circumferentially to the other chambers through small interconnecting pipes. The excess fuel vapor in these chambers, upon igniting, creates a flame front of up to 1,800 deg. F. which travels rapidly through the cold chamber nozzles, past the stator and rotor blades and out the tailpipe. In the new Bendix system, fuel is introduced only to the two chambers equipped with starting plugs. The heat of combustion then travels through the passages to the other chambers, raising their temperature comparatively slowly. Fuel is then introduced into these chambers, providing smooth, flame-less starting at about 1350 deg. F. without danger of thermal shock damage.

Electrol Aims At Landing Gear Market With New Lightplane Item

Economical hydraulic gear uses A-N standard parts; widespread supply sources and available replacement parts are features; for planes to 3,000 lb.

Potential capture of a large share of the lightplane landing gear market is seen in the development by Electrol, Inc. of an economical, light weight hydraulic gear which uses Army-Navy standard parts almost exclusively and which, although a separate and earlier project, will complement the efforts of the National Aircraft Standards Committee to standardize on a wheel-brake-axle combination for lightplanes. (AVIATION NEWS, Mar. 31).

The Electrol gear, by use of A-N standard parts, is able to produce a quality item at minimum cost because of widespread sources of supply. This same general availability of replacement parts simplifies and reduces cost of maintenance. In addition to the standardization of parts, the many versions of the gear are standardized to the extent that parts designed to perform similar functions are interchangeable.

▶ **Used on Ercoupe**—The standard gear is used on the Ercoupe and on several forthcoming personal planes, and can be used on any aircraft up to 3,000 lb. gross weight. It can be produced for tricycle fixed or tricycle retractable gear, with steerable nose wheel, or castering; for conventional gear, fixed or retractable. Modifications of the standard gear are used on Republic's Seabee and Bell helicopters.

While the use of standard parts is the great contributor to the low-cost of Electrol's gear, the emphasis on simplified design and production of President Ben Ashton (AVIATION, Nov., '46), plus the company's seven-year specialization on aircraft hydraulics is a sizeable factor in keeping down costs.

▶ **Other Products**—Electrol produces hand hydraulic pumps and systems, selector valves, check valves, actuating cylinders, unloader valves, relief valves, servo units; it has about 22 items on Grumman Aircraft's Mallard, furnishes most of the hydraulics for the F8F, made the pressure regulator for the main hydraulic system and other items for Douglas Aircraft's transsonic research plane, Skystreak, and has various equipment in Republic's P-84.

That business, plus commercial hydraulics enabled the Kingston, N. Y., company to wind up its fiscal year April 31 with net sales of $953,000, a healthy business for a plant with a 300-man payroll. Future prospects are indicated by a backlog, chiefly aeronautical, of $750,000.

▶ **Sales Growth Anticipated**—Until the lightplane market expands according to form, general hydraulics perhaps will be Electrol's bread-and-butter. But the features of the three models of the company's hydraulic landing gear should mean growing sales with the growing market.

Electrol Model 400-37 is designed for use as the main assembly on a low-wing, tricycle gear aircraft. The inherent efficiency of an air-oil gear enabled the design of a short, hence lighter and sturdier, gear with the result that each assembly weighs but 11 lb. for a 2,000-lb. airplane and but 16 lb. for a 3,000-lb. airplane, less wheel, tire and brake.

▶ **Soft Landings**—The gear provides 7½ inches of wheel travel, a factor in assuring soft landings and preventing bottoming. The jig-load factor, as shown by actual drop test, is 2.65 Gs from 11½ in. and 3 Gs from 14 in. The wheel is carried in a truss arrangement to help bring it back of the CG. The gear can be attached to the main beam of the wing since the vertical element of the leg is about 10 in. forward of the wheel's centerline.

The oleo cylinder is 24ST alluminum alloy, 2⅝ in. in diameter with $\frac{1}{16}$ in. wall thickness. The piston is heat-treated chrome molybdenum steel tubing, 2⅛ in. in diameter, with an aluminum cap. It is chrome plated for resistance to corrosion and wear. The piston rides in a long bearing (2½ in.) and there is no contact with the oleo cylinder's wall, therefore, no wear on the wall. Since the cylinder is the more expensive part, this method of support reduces eventual replacement costs. At the same time, it helps reduce the initial cost of the gear because of lower manufacturing costs.

▶ **Companion Models**—Electrol's Model 400-16 hydraulic nose wheel landing gear strut is the companion piece to the Model 400-37 and has the same jig-load factors. It weighs but 12½ lb., less wheel tire and brake.

The gear has an 8½ in. stroke. The support tube is also the cylinder. The cylinder is machined on the outside as required to provide for either free swiveling or steering. The piston is similar in construction to that used in the main gear but is 1⅞ in. in diameter. In the nose gear, the piston is carried in two bearings, an 8 in. bearing overlap being provided.

▶ **Design for Conventional**—The Electrol Model 400-1 hydraulic main landing gear is designed for aircraft having conventional landing gear arrangement. Since it is to be mounted ahead of the aircraft's center of gravity, a cantilever strut, similar in principle to the Model 400-16 nosewheel, is used in place of the truss type main gear made for tricycle gear planes. Wheel travel is 6 in. and gear weight is 11½ lb.

The support cylinder is 2¾ in. 24ST aluminum alloy. The piston diameter is 1⅞ in. The piston also rides in two bearings.

ITALIAN ROADABLE

Two-place combination craft built near Milan, Italy, and reported to have cruising speed of about 100 mph. on an 80-hp. engine which is also used for ground power. Fuselage and wings are metal and ailerons are fabric-covered. Wings can be folded by removal of one bolt on each wing.

New Type Carburetor Developed by Bendix

Bendix Aviation Corp., has developed a new fuel feed which meters fuel in response to engine rpm. variation; intake manifold pressure and temperature; and exhaust back pressure rather than simply through mass air flow variations through a fixed venturi.

Main components in ude vane-type engine driven fuel pump, centrifugal pressure regulator with temperature unit and pressure-responsive bellows, accelerating pump, water regulator and fuel discharge nozzle. Since air flow to an internal combustion engine is affected by rpm. and manifold pressure, the Stromberg Speed Density system operates with a variable metering orifice controlled by manifold pressure, wtih the metering head controlled by engine speed.

SYNCHRONIZED CONSTANT SPEED CONTROL
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Lightplanes to Benefit From New Data

AVIATION WEEK survey shows research studies now ready on factors necessary to build improved performance, readily salable personal plane.

The long-sought high performance, all weather quiet personal plane can go on the drawing boards today.

An AVIATION WEEK survey of available research data now available shows tomorrow's lightplane could combine these highly salable features:

- ▶ Two-control operation with spin-proof, stall resistant characteristics;
- ▶ Multibladed, fan-type propeller—possibly with circumferential ring—to reduce noise;
- ▶ Smooth wing and fuselage with maximum air tightness for optimum performance;
- ▶ Fuel-injection engine with protected air intake, thermostatically-controlled "hot spot" and air cleaner, for both noise reduction and backfire protection;
- ▶ Slightly tapered wing with washout twist, well cambered thick section with camber increasing toward the tip;
- ▶ Spoilers replacing ailerons for lateral control, permitting full span slotted flaps;
- ▶ Veetail giving necessary stability and control with less area.

That additional research data will continue to be available for better lightplane design is indicated by the fact that technical problems of the personal aircraft industry have been given high priority by the NACA. Wind tunnel tests at the three NACA laboratories will henceforth be carried down to low Reynolds numbers (tunnel speeds, air densities and model sizes embracing the equivalent of lightplane operating conditions) to insure applicability of results to comparatively small, low speed aircraft.

Significance of this decision is seen in the fact that it will mean increased tunnel operating time and additional analytical and computation time and effort by the NACA staff to extend data below normal high speed testing range. For example, tests of a high speed fighter or pilotless aircraft wing or fuselage at high subsonic speeds will be extended down to low speeds before the tunnel is shut down, and research instrumentation will continue to record data down through the equivalent of lightplane landing speed.

▶ **Wing Design**—Recent tests[1] indicate that changes in camber have little effect on the drag of laminar flow wings, thereby permitting their use on lightplanes, which require comparatively large camber to produce high litt at low speeds. Changes in camber on low drag airfoils merely shift the range of angles of attack over which low drag is obtained, thereby permitting the designer to select a laminar flow section producing low drag at cruising angle of attack. These new airfoils have only about half the drag of equivalent conventional sections, indicative of the cruising speed gains available to lightplane designers. Smooth construction is essential, however, to preserve low drag characteristics of the section.[2]

Lateral instability, manifest by wing-dropping created by tip stalling, can generally be avoided by using only small taper, washout wing twist, a fairly thick, well-cambered airfoil and increasing the camber towards the tip.[3] Tests have indicated that the slotted flap is superior to the split flap as a high lift device due to its lower drag and consequent reduced effect on airplane stability.[4] Boundary layer control is showing ever-increasing promise and data already available indicates its effectiveness in increasing lift and lowering drag.[5]

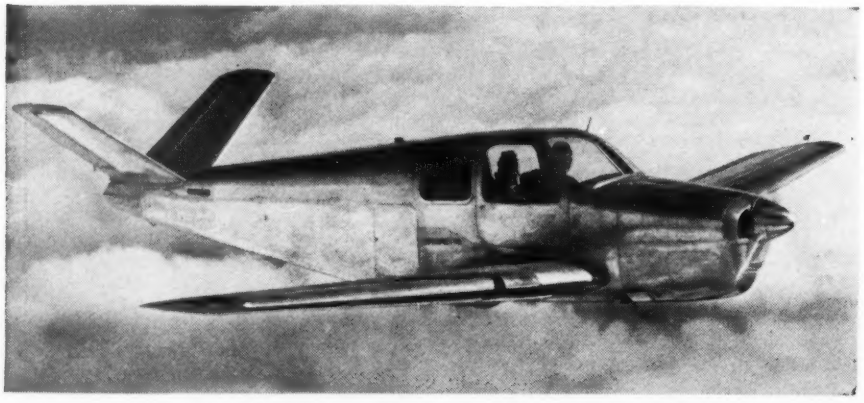
▶ **Stability and Control**—A surprising and encouraging result of recent research is the indication that long-period (phugoid) stability is not essential and that the damping in pitch of the horizontal tail is relatively unimportant.[6] It has been found that the static margin or static longitudinal stability is the controlling factor, discovery which reduces a heretofore complex calculation to a simple, straightforward problem of CG location.

A equally important discovery is that lateral stability is best obtained by providing a high degree of directional stability through use of a large vertical tail surface.[7] Research continues to indicate the growing promise of spoilers for lateral control[8] (first used on the Northrop P-61). Tests indicate that off-setting the engine thrust line makes possible large reduction in the effect of power on and off on stability and control.[9] The "vee" tail (as used on the Beech Bonanza) is proving increasingly practical and its provision of adequate stability and control with less surface area than the conventional tail promises drag reduction.[10]

▶ **Spinning and safety**—Spinproof design is now thoroughly understood and design data is available to the engineer.[11] Although design data for two-control operation is available, the NACA is studying a Fairchild PT-19 with aileron and rudder inter-connected through a spring linkage and has revealed that it will definitely measure flying qualities of new and interesting types of personal aircraft, including various types of two-control systems.

▶ **Drag Reduction**—Recent data[12] indicates that the drag "cleanup" of various design details could reduce the drag of a typical personal aircraft 15%, increase its speed 5% and reduce 22 hp. required for cruising. These studies reveal that the detail design of engine cowlings, air scoops, surface roughness and air leakage through the airplane surface can determine the cruising speed of a lightplane to a far greater extent than the original selection of the basic combination of fuselage, wing, tail unit, cabin enclosure and power plant. (Also see (AVIATION, May, p. 77, June, p. 64).

▶ **Propellers**—Diameter appears to be the key to efficiency, which increases with greater diameter.[13] Recent studies indicate that such factors as blade airfoil section, thickness, pitch distribution, plan form and solidity have little effect on takeoff performance of a lightplane, pointing to controllable pitch as the single effective method. The noise pressure of a lightplane may be reduced 90% through the use of multibladed, fan-type propellers, rendering the airplane virtually inaudible at a distance of 300 ft.[14] Studies of pusher installations



"VEE TAIL as used on Beech Bonanza is proving increasingly practical and its provision of stability and control with less surface area than conventional tail promises drag reduction."

show efficiency losses created by body interference, which is increased by lowering retractable landing gear and flaps.[15]

▶ **Gust Loads**—Studies reveal that loads imposed by gusts in turbulent air are often greater than the maneuvering loads for which the airplane was designed.[16] Future lightplanes can be designed to gust load factors, rather than conventional load factors, using available knowledge on the frequency of occurrence of gusts in the atmosphere.

▶ **Weather Protection**—An all-weather lightplane is within reach on the basis of available research data. Inertia separation of air from water, snow or ice is now practicable through the use of a protected air intake.[17] Thermal deicing of the wing leading edge by exhaust heat can prevent ice formation under even the most severe icing conditions.[18] The combination of fuel injection, thermostatically controlled "hotspot", air cleaner and speed density entering device can effectively eliminate the icing hazard in lightplane power plants.[19]

▶ **Future Needs**—Improvements in safety, economy and performance of personal aircraft will continue to require cooperative efforts of fundamental scientific research and applied development work by industry. The general lag of 3-5 years of application behind available data must be closed considerably if the lightplane is to be improved rapidly enough to build up widespread markets.

Continued research on lateral control and tail surface systems will further increase the safety of the lightplane and stall-resistant wing design, coupled with low drag high lift devices will insure a reduction in the landing space and pilot skill requirements now extant. Incorporation of the NACA laminar flow airfoil on personal aircraft, now a practicality, can greatly enhance performance—to a point where it is felt that cruising speeds might well place the lightplane in competition with airlines at distances up to 500 mi.

Further research is certain to lower the skill required for safe personal aircraft operation, thereby broadening its appeal which, in turn, will permit price reductions competitive with the average automobile.

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GUST RESEARCH shows "future lightplanes can be designed to gust load factors, rather than conventional load factors, using available knowledge on frequency of occurrence of gusts."

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Studies Substantiate Theory Of Laminar-To-Turbulent Flow

Cause of drag bogey of modern high-speed aircraft—boundary layer flow turbulence—experimentally determined to be related to amplification of velocity oscillations.

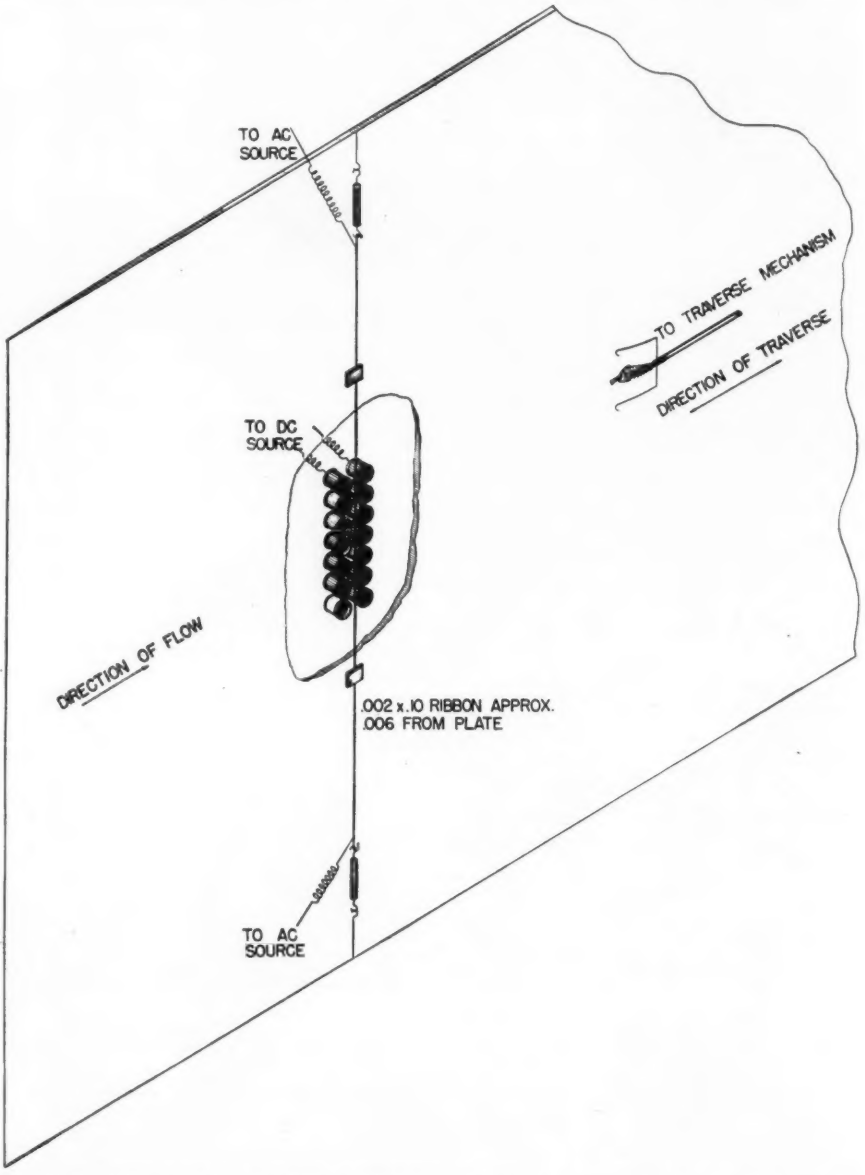
Results of wind tunnel experiments at the National Bureau of Standards, with the cooperation of the National Advisory Committee for Aeronautics, afford a more complete understanding of the origin of air flow turbulence characteristics. The transition from smooth to turbulent flow—a most important factor in the drag of modern aircraft—has been found to be directly related to the growth of velocity oscillations in the thin boundary layer, through which slipping takes places when relative motion of a solid surface with respect to air occurs.

When a well-streamlined body is subjected to air flow, the boundary layer envelopes it as a sort of a skin. Friction between the body and air depends greatly upon the thickness of this layer and the ease with which the strata of air slide past each other. If this sliding is opposed only by viscosity of the air, the flow is said to be smooth, or laminar, and friction is low. But if the flow becomes turbulent, the strata intermingle, no longer sliding easily over one another, and friction is high.

▶ **Transition Theory**—As the stretch of surface over which the air has passed increases, the boundary layer thickens, becoming increasingly susceptible to disturbances. Thus, the layer apparently becomes less and less stable, and at some point transition to turbulent flow occurs. One of the more important questions in this connection has been, what determines the stability of a laminar boundary layer? Many investigations, both theoretical and experimental, failed to answer this question. However, in the early '30's two German mathematicians, Tollmien and Schlichting, following a line of attack introduced previously by Lord Rayleigh, succeeded in finding criteria for stability of the boundary layer formed when air flows along a plane surface at constant mean speed. According to this theory, disturbances were assumed to cause variations in the boundary layer velocity and produce velocity waves of length determined by the frequency of the disturbance. Certain wave lengths would be amplified while others would be damped. The growth of amplified waves was assumed to result in transition to turbulent flow.

▶ **Flow Experimentation**—The theory was not above criticism and was discredited from the start by experimentalists because amplified waves could not be found. By use of the hot-wire anemometer, which was becoming an increasingly important tool for the investigation of such phenomena, it was shown that disturbances, such as those produced by turbulence in the surrounding flow, did cause irregular motions in the boundary layer, but there was no apparent growth of amplified waves leading to transition. The conclusion drawn from all experimental evidence was that change to turbulent flow occurred when the boundary layer was sufficiently disturbed by external influences.

This was the status of the problem when a fresh attack was first made by the aerodynamics group of the National Bureau of Standards. As a result of the previous work, there was considerable interest in the possible effect on a laminar boundary layer if



TEST SET-UP FOR FLOW-TRANSITION STUDY. Schematic drawing of apparatus for study of transition from smooth to turbulent air flow in boundary layer adjacent to flat aluminum plate ¼-in. thick, 4½ ft. wide, and 12 ft. long. To cause oscillations artificially, thin metal ribbon was stretched across plate within boundary layer at known distance from pointed leading edge and held edgewise to flow by thin spacing blocks. Electromagnets behind plate provided steady magnetic field, so that alternating current passing through ribbon caused it to vibrate, producing oscillations which travelled downstream to be picked up by hot-wire anemometer. By varying frequency of ribbon current and position of anemometer, amplified, damped, and neutral waves were studied.

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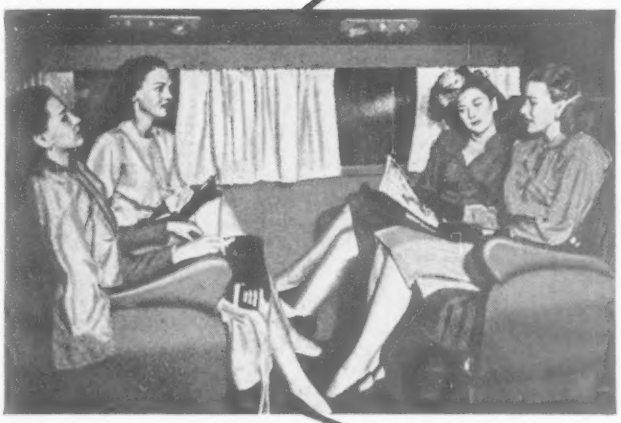

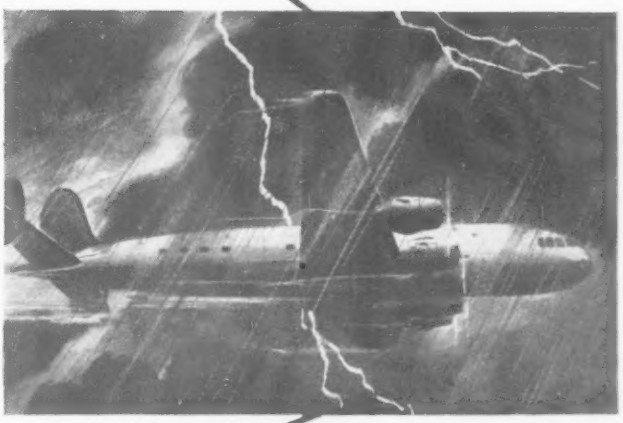

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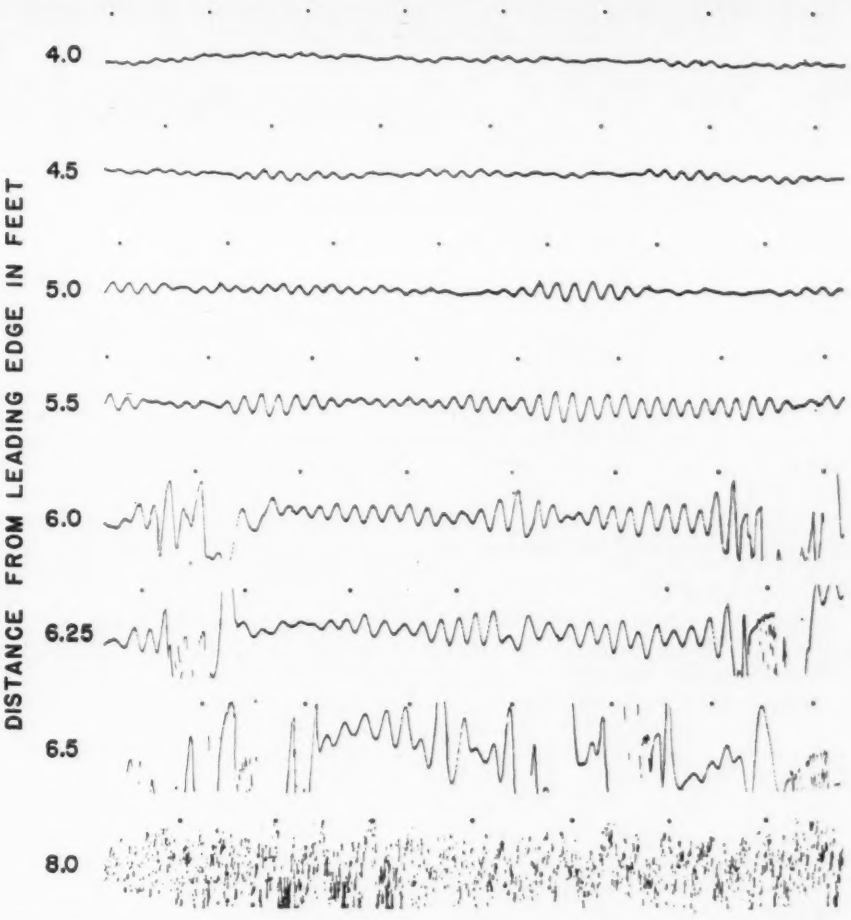
Over the years, International Nickel has accumulated a fund of useful information on the selection, fabrication, treatment and performance of engineering alloy steels, stainless steels, cast irons, brasses, bronzes and other alloys containing Nickel. This information and data are yours for the asking. Write for "List A" of available publications.

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N.Y.

disturbances could be reduced to the vanishing point. One difficulty with wind tunnel experiments up to that time had been the disturbing influence of stream turbulence, and the need for less turbulent wind tunnels was becoming increasingly urgent. Accordingly, the Bureau of Standards undertook an investigation of damping screens and found that by their use turbulence could be reduced to previously unattainable levels. Along with this investigation the extent of laminar flow along a flat plate was studied as the turbulence of the tunnel was reduced. Contrary to expectations, the extent of laminar flow did not continue to increase with reduction in stream turbulence, but reached a limit beyond which no further change occurred.

The hot-wire anemometer was then placed in the laminar boundary layer, to determine the extent to which the layer was disturbed when the external flow was known to be exceedingly smooth. A very strange phenamenon was observed—velocity was found to vary in a sinusoidal manner with a frequency so definite that it could be determined easily. The oscillation increased in amplitude with distance from the leading edge of the flat plate and finally broke into turbulent flow. Thus, amplified velocity waves leading to transition were found to be a reality. Comparison with the Tollmien-Schlichting criteria showed that wave growth took place where it was expected according to theory.



GRAPHIC DATA OF BOUNDARY LAYER FLOW. These oscillograms show successive stages in transmission from laminar to turbulent flow in boundary layer of flat plate subjected to air current. Experiments show that transition is result of the amplification of oscillations of favored frequencies caused by variations of velocity within boundary layer. Velocity variations were picked up by hot-wire anemometer and registered on cathode-ray oscillograph. Oscillations shown are amplified components of random disturbances originating in stream outside boundary layer. Amplitude of oscillations increased with distance from the leading edge of plate. Just ahead of transition, bursts of extremely large amplitude occurred, and at initial point of transition were accompanied by irregular high-frequency fluctuations characteristic of turbulence.

► **Further Proving of Theory**—With this discovery, the stability theory, which had been mainly of mathematical interest, assumed real significance, and attention was turned to further experimental studies designed to subject the theory to more rigorous tests. What was desired was the experimental counterpart of the mathematical procedure. In the theoretical analysis, a periodic stream function was substituted in a differential equation and solutions were obtained for certain prescribed conditions. The parallel experimental approach was then to cause a periodic disturbance in the boundary layer and to study the characteristics of the resulting wave.

► **Test Apparatus**—To produce these boundary layer disturbances, a metal ribbon was stretched across a flat aluminum plate at a known distance from the sharp leading edge and sufficiently near to the surface to be within the boundary layer. Central portion of the ribbon was accurately spaced and held edgewise to the flow by thin spacing blocks. Electromagnets were placed on the back of the plate to produce a steady magnetic field, so that when an alternating current was passed through the ribbon it would vibrate in and out from the surface. When air was flowing, the waves produced by the vibrating ribbon traveled downstream past the hot-wire anemometer. The wire could be moved fore-and-aft along the plate at a fixed distance from the surface, to examine the growth or decay of the wave as it traveled downstream through the boundary layer. Wave lengths were selected at will by choosing various frequencies for the ribbon. By this procedure amplified, damped, and neutral waves were found, and wave diagrams were prepared similar to those indicated by the theory. From these diagrams were produced maps showing zones of damping and amplification. On the whole the agreement with theory was excellent.

These investigations have led to similar experiments with a curved surface, as well as a re-examination of the theory, at the California Institute of Technology. Ultimate result has been that the conditions governing the stability of laminar boundary layer are now understood, and the theory may be used with complete confidence.

Transition from laminar to turbulent flow may result from a velocity wave, set up either by a vibrating object in the boundary layer, such as the ribbon, or by disturbances from the outside, such as stream turbulence and sound. Stream turbulence generally has a more nearly random distribution of energy with frequency than does sound. Sound disturbances with a concentration of energy in frequency bands that are highly amplified by the boundary layer may thus be more conducive to early transition than stream turbulence. This is important in free flight where turbulence is probably negligible but where engine and propeller noise is present in large amounts.

It is possible that boundary layer oscillations may arise from internal as well as external disturbances—from surface irregularities and vibration of the surface. A randomly distributed roughness may produce effects similar to small amounts of turbulence in the air stream. Vibration of the surface, like sound, may produce oscillations when the frequency is near some value that is highly amplified by the boundary layer. An investigation of these and other phases of the problem promises to provide additional useful information on this important problem of transition from laminar to turbulent flow.

All-Weather Tests Speeded By New AAF Climatic Hangar

Grilling of aircraft and equipment in world's biggest hot-cold laboratory saves time and money. Commercial use seen at later date.

A project to speed operational testing of Army Air Forces aircraft, ground equipment and personal clothing at substantial cost savings is nearing completion at Eglin Field, Fla. Essentially a man-made Arctic proving ground, the project consists mainly of an insulated hangar 200 x 250 x 60 ft., enclosing about 2,900,000 cu. ft. of space, with additional cold test, hot test, jungle and tropic-marine rooms an all-weather room for physiological testing and a stratochamber.

Facilities are available to industry now only if military contracts are involved, but use of the climatic hangar will be liberalized as the military backlog is reduced.

Operating costs, which purely commercial testing will be required to share, run about $1,000,000 annually. The hangar cost $6,000,000 to build—about $10,000,000 with full equipment—and is expected to pay for itself in five years or less. Idea for the facility is credited to Col. Ashley C. McKinley of Sterling, Va., and the project was forwarded and completed through efforts of Gen. Grandison Gardner and Col. H. O. Russell of Air Proving Ground Command.

Brig. Gen. Carl A. Brandt, commanding general of APGC, says the hangar will test "everything from shoelaces to airplanes." The main hangar space is used to determine types of equipment giving maximum efficiency in conditions of extreme cold, storm, sleet and snow.

▶ **Tremendous Facility**—Capable of accommodating five B-29's at one time, the structure at present contains one B-29, a Fairchild C-82, three fighters including a Lockheed P-80, North American P-51 and Republic P-47, a Sikorsky R-5 helicopter, several Armored Forces tanks, trucks and a jeep, all of which have been subjected to weeks of bitter temperatures ranging from zero to —70 deg. Temperatures within the hangar and test rooms can be maintained within range of minus 70 to plus 165 deg. F. Artificial sunlight and localized wind storms up to 100 mph. with sleet, snow and rain are possible.

Facilities permit test runs on all types of aircraft. Engines can be run up and ground tested, weapons fired, bombs dropped, landings and takeoffs simulated to test landing gear struts, brake action checked, and functioning of electrical, hydraulic and heating systems tested under extreme weather conditions. Objective in planning the project has been to simulate service conditions as closely as possible so that testing can be coordinated with final service testing in natural locations. Method of testing equipment is essentially the same as the 50-hr. test of aircraft plus operation of all operable parts such as cables, bomb bays, shackles, etc.

▶ **Defects Uncovered**—Most common failures uncovered in cold weather testing of planes were electrical, stiffening of cabels and lubrication, the latter presenting a tremendous problem. New oils and greases are better than prewar products but require more flexibility. When they function in low temperatures, they are useless at high.

Other deficiencies and failures:

- Six volt battery stops discharging at minus 20 deg. F., 12-v. stops at minus 40.
- Instruments cease to function.
- Fuel lines loosen with cold due to different rates of contraction of component materials.
- Synthetic rubbers and plastics become brittle. Natural rubber stands up better.
- Fire equipment becomes unsuitable.
- Windshield frosting remains unsolved.

In addition, aircraft cockpit and cabin heaters operating on the ground as well as in flight are needed for flying personnel. To keep warm on the ground before take off, pilots must wear Arctic clothing. Once in the air, they suffer from heat.

Previously all testing of aircraft and equipment for operational suitability in extreme climates has been done in natural locations.

▶ **Time-Cost Saving**—Among the difficulties were transportation of personnel, equipment and supplies over great distances; time lost in waiting for suitable temperatures; difficulty of close coordination between designers, manufacturers and testing organizations due to distances from industrial centers; time needed to modify or change design of unsatisfactory equipment made waiting till the next season necessary before testing item again.

Indication of the time saved is provided by comparison of the testing period required in a natural location with that needed in the Eglin Field hangar. At Ladd Field, Alaska, 26 field tests required from September, 1945, to March, 1946, for completion. In the climatic hangar, 40 tests were made in six weeks.

In New Plant

Piasecki Helicopter Corp. has moved into its new $500,000 helicopter development and manufacturing plant at Morton, Penna. Located on a 55-acre plot, 10 miles southwest of Philadelphia, are an administration building of 20,000 sq. ft. and manufacturing area of approximately 50,000 sq. ft.

JET PRINCIPLE UTILIZED IN NEW FRENCH 'COPTER. Shown being readied for flight tests is helicopter-gyro craft SNCASO-1100 "Gyravion." Engine—170 hp. aircooled Mathis—acts as compressor to turn rotor blades via tip jets, also drives conventional 3-blade fixed pitch prop at rear (not seen) for forward motion (see AVIATION's Yearbook, page 124, Mar. 1947). Horizontal stabilizer supports fixed vertical fin (not installed), and conventional rudder is carried by prop shroud ring. (IN photo)

TELLIN' THE WORLD— YOU'VE GOT A

FAIRCHILD F-24

You've also got great expectations! Of fun, excitement, whizzing through space! Well, we can tell you . . . and we've had plenty of experience in aircraft . . . flying *is* wonderful! And it's even *more* so, if you know the following:

It's wise to use only fine quality fuels and lubricants. Remember that. And keep in mind also, you can always get excellent quality aviation products by asking for *Phillips 66!*

You'll see—at airports over the entire mid-west—orange and black shields marked Phillips 66. Those signs invite you to stop and take on carefully developed engine oils and UNleaded 80-octane gasoline! Yes, Phillips is interested in helping your plane to better performance and a cleaner engine!

Again, you'll see!—when you meet us at our air field "66" signs! The Aviation Department, Phillips Petroleum Company, Bartlesville, Oklahoma.

Phillips 66

AVIATION GASOLINE

Technical Information on FELT...No. 1

FELT WICKS RELIABLE, CONTROLLED LUBRICATION

Four Basic Wick-Feed Lubrication Systems Meet Diverse Requirements Design Is Simple, Cost Is Low, Reliability and Long Life Assured

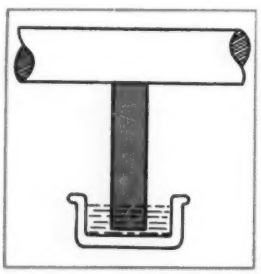
Lubrication by means of felt wicks permits oil to be fed to bearings and other moving parts, automatically and without failure or interruption. Wicks permit extremely fine control of lubricant, from many drops to a small fraction of a drop per minute. Where actual consumption of oil is low, oil-impregnated felt makes possible the use of completely enclosed parts, such as sealed bearings, and is in fact essential to them. In such applications it can be expected that lubrication will be supplied throughout the life of the part, and that no attention will be required between major overhauls.

The cost of a felt wick is low, in fact infinitesimal compared with the cost of the machine or part whose performance it protects.

TYPES OF WICK OILERS

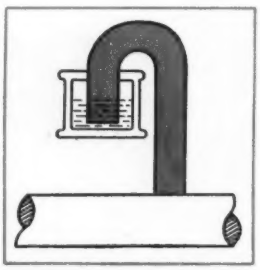
There are four types of wick lubrication systems. Choice of any given type depends upon such factors as the lubrication needs of the moving part, accessibility, available space, operating and servicing conditions, and similar matters of design and use. The Engineering and Research Laboratories of the American Felt Company will gladly collaborate with you in working out the design of the most desirable type of system and in selecting the proper size and grade of wick.

1. BOTTOM WICK OILER



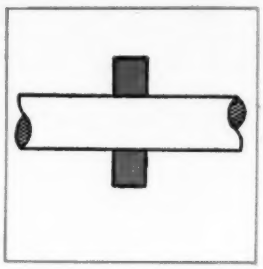
In this type, the felt wick is immersed in a reservoir of oil beneath the bearing, and through capillarity carries the oil upward to the point of lubrication. Maximum vertical wicking distance, about 6 inches. This is generally considered the most efficient system. Unused oil is returned to the reservoir, and no attention is required beyond occasional cleaning and replenishing of oil as required. An ideal system for apparatus such as motors, generators, and factory equipment.

2. SYPHON WICK OILER



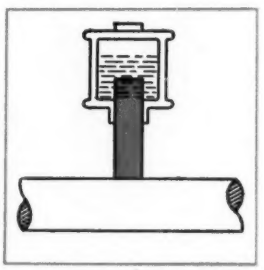
Felt wicks of this type are widely used, particularly where oil is to be delivered uniformly and at a controlled rate to a remote friction point. In addition to other methods of control, the flow of lubricant can be increased by increasing the vertical wicking distance from the reservoir to the point of lubrication, taking advantage of gravity.

3. ABSORBENT OR PAD FEED OILER



Here the lubricant is contained entirely within the felt, and is released automatically as required. This is the type often employed in sealed installations, though it may also be used in conjunction with a filler tube, the chief purpose of which is to act as a small reservoir. The oil absorption or storage capacity of felt is high. For example, SAE F-10 felt, recommended for pad oiling, will store oil of any viscosity to the extent of approximately 450 per cent of its own weight.

4. TOP FEED OILER



The reservoir is above the lubrication point, and oil is supplied through a felt wick inserted in an outlet in the bottom. In this case, the wick acts as an obstruction to control the flow of oil. Frequently the wick is mechanically constricted to effect further control while taking advantage of storage capacity between constriction and delivery point. This insures uniform lubrication and provides a surplus reserve of oil in the event of an empty reservoir.

SELECTION OF WICK FELTS

There are four types of felt recommended for wick lubricating systems. The physical characteristics of each are under complete control, and are standardized. As much care should be exercised in wick selection as in the choice of lubricants. The felt must have high absorption capacity and capillarity. Porosity must be controlled, filter action must be excellent, density, size, fibre quality and acid neutrality must be governed within close limits. Acid neutrality is necessary to avoid breaking down the oil or corroding metals. The wick must be highly cohesive, which requires medium to long fibres. Residual ash content must be low, to minimize glazing or scoring at the delivery point. All these requirements are thoroughly understood by American Felt Company engineers and production men. Manufacture, test and inspection methods have been developed over a long period of years, resulting in complete uniformity within the four grades, and reliable, predictable performance. The four grades are as follows:

No.	SAE Standard	Type of Wick or Lubricating System
7546	F-1	Round, Strip, Punched
7545	F-5	Strip, Washer, Absorbent Pad
51018	F-10	Absorbent Pad, Washer
51002	F-50	Ball Bearing Seal

Generator commutator and bearing lubricated with SAE 20 oil with a bottom wick oiler. A 3/16" diameter American Felt Co. Mdse 7546 wick with a wicking distance of approximately 1 inch is used for this critical lubricating job. With a shaft speed of 9000 RPM and a 200-hour oiling schedule these wicks always equal the life of the bearings, which are replaced after 100,000 miles or 2000 hours continuous operation.

HOW SUPPLIED

Wick felts are furnished either in bulk, or ready-cut into wicks to your own specifications, round, square, strip, pad, punched, or special types to meet your needs. By use of precision cutting machines of modern design, American Felt Company wicks are customarily supplied with a dimensional accuracy of plus or minus .005 inch.

OTHER USES

Felt wicks can of course be used to carry or control a wide range of fluids, such as water, ink, solvents. Felt can also be impregnated with viscous or solid lubricants such as grease, glycerine, dispersions of micronized graphite, tallow, hydrogenated and sulphonated oils, silicone greases, and with various waxes, thus providing protection at points where loads and speeds are such that oil is not required.

SEND FOR DATA SHEET

The material in this advertisement has been condensed from American Felt Company Data Sheet No. 6, "Wicks and Lubrication." This eight page Data Sheet is the basic authority upon the subject. It contains full technical data, including formulae, charts and graphs, tables. From it any engineer can calculate wick performance and arrive at a design and specification that will meet the requirements of a given application. Write on your letterhead and a copy will be sent you. Along with it you may wish to receive a list of the 15 American Felt Company Data Sheets containing technical information on the various characteristics, types and applications of felt and felt products.

BASIC PRINCIPLES OF WICK LUBRICATION

Wick-rise rate or capillarity varies directly with wick density, inversely with oil viscosity.

Wicking distance likewise varies directly with wick density, inversely with oil viscosity.

Oil feed or delivery rate is governed by the absorption capacity of the wick, its capillarity, the cross sectional area of the wick, and the wicking distance.

HENCE: With *syphon wicks*, the greater the wicking distance, and the greater the cross sectional area, the greater the flow.

With *bottom wicks*, the shorter the wicking distance, and the greater the cross sectional area, the greater the flow. (Maximum recommended distance about 6 inches.)

With *syphon, bottom, and pad wicks*, flow can be reduced by mechanically compressing or restricting a section of the wick between the reservoir and point of delivery.

All factors involved in the design of a wick lubrication system have been scientifically studied by the American Felt Company, and are susceptible to accurate mathematical calculation. Felt is an engineering material, and its performance can be determined in advance with as much accuracy as that of any metal or other substance.

ENGINEERING USES OF FELT

Wicks	Filtering Fluids and Gases
Oil and Grease Retainers	Packing
Dust Seals	Polishing
Gaskets	Caulking
Cushioning and Shock Absorbing	Insulation
	Sound Absorption
	Vibration Isolation

Felt is an engineering material of great versatility. It can be made hard as a board, or soft as a kitten's ear, oil-conducting or oil-sealing, fire-proof, water repellent, or fungi resistant, white as snow or any color including black, and it can be cut, punched, turned, ground, pressed and moulded to shape.

American Felt Company

TRADE MARK

Engineering and Research Laboratories: Glenville, Conn. PLANTS: Glenville, Conn.; Franklin, Mass.; Newburgh, N. Y.; Detroit, Mich.

SALES OFFICES: New York, Boston, Philadelphia, Atlanta, Rochester, Chicago, Detroit, Cleveland, St. Louis, Dallas, San Francisco, Los Angeles, Portland, Seattle, Montreal

New Aircraft and Engine Designs Pose Unusual Vibration Problems

Increasing airplane speeds and higher wing loadings have brought to light a new propeller problem which is of fundamental concern to airframe designers as well as power plant engineers.

The problem, becoming particularly acute with a larger diameter propellers, is known as "one P" vibration, or "first propeller order excitation," and can cause propeller blade stresses of significant magnitude. To help overcome the situation thus being created, Hamilton Standard Div. of United Aircraft Corp. has made it one if its most important projects and today is making initial data available to the industry.

▶ **The Problem**—Simply stated, the situation is this: since the propeller blade is a whirling airfoil, basic aerodynamic principles apply; i. e. neglecting airfoil shape, the lift of force pulling the blade varies directly as the area and angle of attack, and as the square of the speed with which the air passes it. Thus, if blade angle of attack is varied, the lift (or forward force) will vary accordingly, other things being equal.

When the thrust line is directly into the airstream, the blade will operate at a constant angle of attack through one revolution. But, if there is an angle of inclination between thrust line and airstream, the propeller will operate at a varying angle of attack, subjecting the blades to fluctuating lift forces during each revolution.

Assume, for example, an aircraft is in a climb, thus tilting the propeller plane of rotation to give considerable positive angle of inclination between thrust line and airstream. As the blade goes down clockwise, inclination angle is added to normal angle of attack, increasing lift force to a maximum when the blade is horizontal. At the bottom of the swing the increase in lift force is reduced because inclination angle has no effect on angle of attack. As the blade reaches horizontal on the upswing, effective angle of attack is decreased by inclination angle, thus reducing lift (or forward force) to a minimum.

▶ **Additional Factors**—Angularity between airstream and propeller disk is aggravated by influence of the wing on the air in front of it. Because of the wing lift, an upflow in air approaching the leading edge is induced, adding to angularity resulting from angle of attack position of the wing. As lift is increased for climb, upflow is increased, and the closer the propeller to the wing, the sharper is the angle. Under climbing conditions, this can be an appreciable effect because the angle of upflow into the propeller approaches the same order of magnitude as the wing angle of attack.

With the blades' lift increased and decreased each revolution whenever angularity exists between thrust and airstream lines, the entire propeller is subjected to a powerful forced vibration. Intensity of this vibration will vary, according to theory, directly as the angle of inclination, as the square of forward airspeed and further as about 6.5 power of the diameter, other conditions remaining constant.

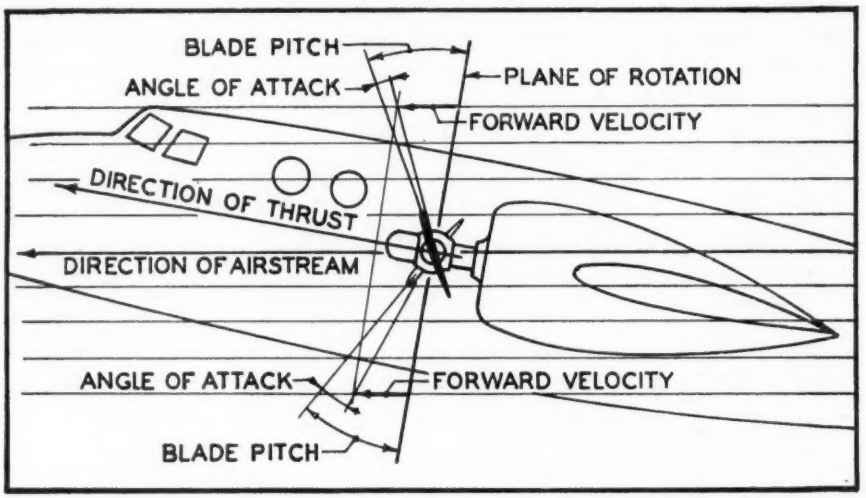
A major difficulty with "one P" vibration is that there are no external symptoms because there is no vibratory reaction at the engine shaft. Too, there is no structural vibration or performance loss to give warning. Though its presence has been known as a result of Hamilton Standard's vibration stress examinations, its importance remained undetermined until vibration testing of propellers on new aircraft designs revealed significant stresses.

▶ **Magnitude of Problem**—Magnitude of "one P" vibration depends on airplane operating conditions, and how serious the ensuing stresses may be depends on fatigue strength of blade structure. It is believed that in modern plane designs the excitations can be powerful enough to create stresses beyond established useable strength of current blade designs.

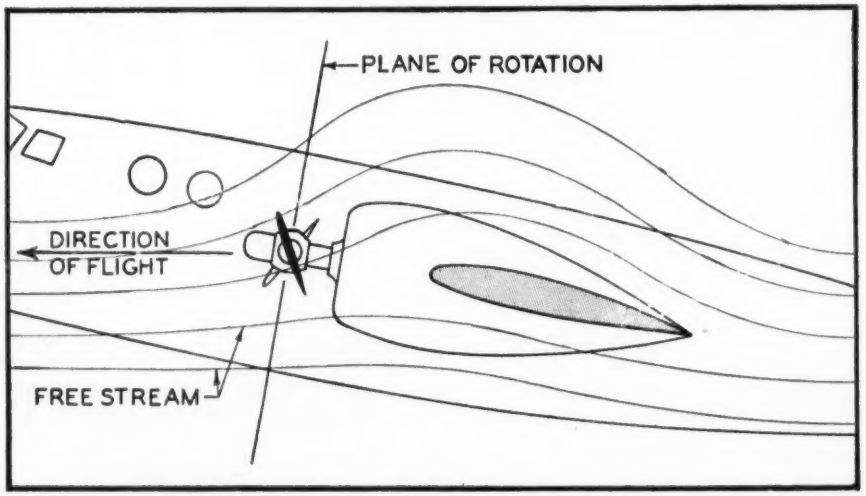
Because the excitations depend on load, speed, and angle of attack in relation to propeller characteristics, these factors can be utilized to advantage through the establishment and maintenance of correct operating conditions.

▶ **Possible Solutions**—Besides developing propeller designs aimed at reducing "one P" Hamilton Standard engineers believe the problem can be simplified by coordinating airframe design. Today it is felt that locating the propeller well forward of the wing leading edge is highly desirable, and that it may be necessary, in some cases, to tilt the propeller downward from the wing chord line.

Careful consideration in predicting inflow angles must also be given to the effect of propeller slipstream on the airflow about the wing. In this connection, they report, more extensive use of flaps in climbing warrants careful consideration from initial design to operating stages.



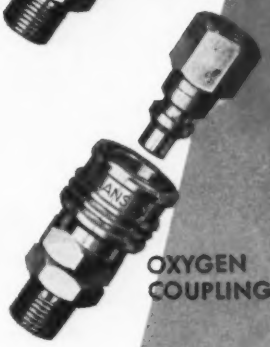
HOW STRESSES ORIGINATE: Schematic drawing showing different angles of attack of one propeller blade during one revolution when plane of rotation is tilted.



BUILDING UP STRESSES: Upflow in airstream induced by wing in climbing position adds to angularity between blade and airstream.

HANSEN *Couplings*
Are Used On a VARIETY of JOBS

ACETYLENE COUPLING



OXYGEN COUPLING

AIR, OIL—GREASE COUPLING

EACH DAY a new use is found for Hansen couplings, proving their adaptability, versatility and right design. Hansen couplings have made their mark in many fields and their long list of accomplishments is growing longer each day.

There is a specific Hansen coupling made for air, oil, grease, oxygen, and acetylene, and they come in a wide range of standard sizes.

Hansen couplings are simple and easy to operate — merely push plug into socket, coupling is connected and locked — slide sleeve back with thumb, coupling is unlocked and disconnected. Hansen couplings are rugged, with all moving parts fully protected, consequently they will stand up under rough usage. Complete swivel action prevents kinking of hose. They can be readily incorporated in new or existing equipment.

Our representatives will be glad to discuss with your engineers the possibilities and many advantages of Hansen couplings. Send for illustrated catalog.

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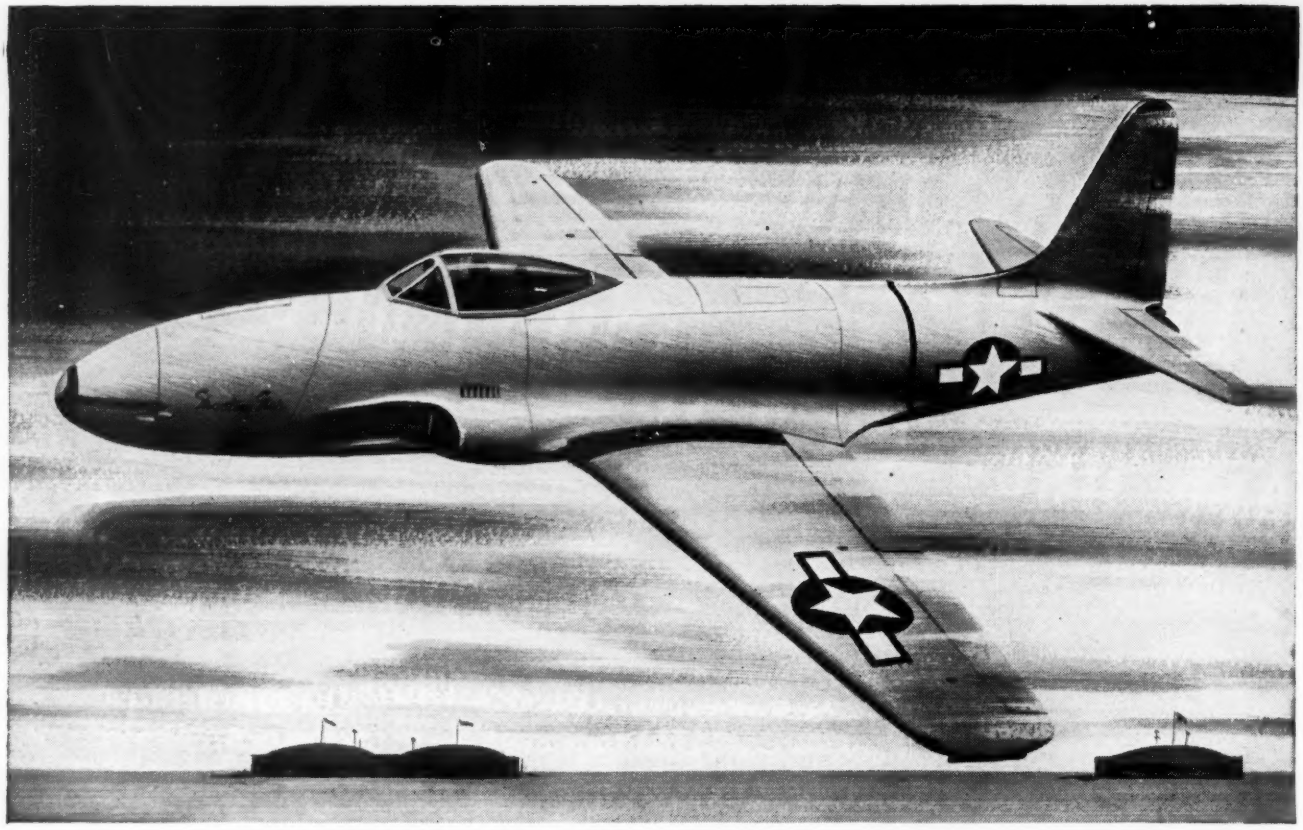


623.8 Miles an Hour!

A WORLD SPEED RECORD FOR AMERICA

The Lockheed P-80 Shooting Star with which the Army Air Forces set a new international speed record of 623.8 miles an hour at Muroc Lake, California, was powered by the new Allison Model 400 Jet Engine.

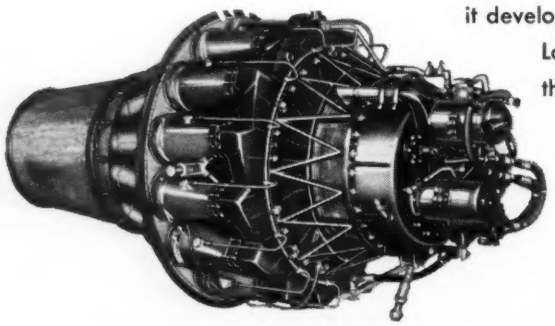
Thus the teamwork of the American aviation industry and the military services has again paid off in clear-cut leadership for American airplanes and American engines.

Since the end of World War II, Allison has concentrated on design and development of new and higher-powered jet engines.

Allison is proud of the engine which it developed for this record-breaking Lockheed P-80. It represents the latest and the finest of the 2000 jet engines built by Allison.

But no nation can ever afford to relax in its aircraft development. So Allison continues to apply to jet engines the experience which was accumulated in its production of 70,000 war-proven liquid-cooled V-1710 engines.

This continuing research will result in more new engines to maintain for America the Air Power which means Peace Power for our land.



THE MODEL 400 JET ENGINE made by Allison Division for the Lockheed *P-80 Shooting Star.* Allison has built more jet engines than any other company in the world.

Allison

DIVISION OF

INDIANAPOLIS, INDIANA

GM
GENERAL MOTORS

Martin Develops Propeller Feathering Unit

System designed to utilize fully high takeoff weights of new twin engine craft seen cutting operating costs 43 to 58 percent.

Designed to permit full takeoff weights and increase operating economy of twin engine transports is the first automatic propeller feathering unit, developed by Glenn L. Martin Co.

Such a system, Martin engineers told Aviation Week, is a necessity if the high takeoff weights of newly developed twin engine airliners are to be fully utilized.

Because of inherent high windmilling drag of high activity factor propellers being used in current and future designs, the problem of takeoff climbout has required special treatment in the case of twin engine aircraft if they are to be certified at maximum gross weight under Civil Air Regulations.

The Martin automatic feathering system secures the maximum economic benefits by insuring optimum airplane performance during a complete or partial engine failure on takeoff. This is accomplished:

▶1. By feathering the propeller and stopping the fuel booster pump on the affected engine when power drops below a useful minimum for more than a momentary period.

▶2. By permitting the propeller to perform in a normal manner if an abrupt power loss is of momentary duration (such as an engine cough or sputter) or if the power loss is only partial in that thrust being delivered is greater than the wind-milling drag of the propeller.

▶3. By providing means whereby the propeller may be unfeathered through the normal propeller system if power output is restored after automatic feathering operation has begun. Thus, the pilot can at any time override the automatic system.

The high windmilling drag of the propellers chosen for their cruise performance has resulted in a loss in estimated takeoff gross weight of approximately 5,300 lb. at an airport altitude of 4,500 ft. It is readily seen that load decreases of this magnitude will result in a crippling increase in direct operating cost per ton mi. Preliminary tests indicate this entire amount can be recovered with the automatic feathering system.

Operating Savings—If a Martin 202 is operated over an average trip length of 300 mi. at an average airport altitude of 1,000 ft., the automatic feathering system will result in an increase of approximately 4,000 lb. payload—equivalent to nine passengers and 2,200 lb. of cargo, decreasing direct operating cost per ton mi. by 43.2%. With higher airport altitude, and runs over 300 mi., this effect becomes even more pronounced. On a run from Salt Lake City to Denver, for example, takeoff would be made at an altitude of 4,220 ft. and a range of 500 mi. would be necessary. Here, a payload increase of approximately 5,000 lb. would be realized—representing 17 passengers and 1,700 lb. of cargo and a reduced direct operating cost per ton mi. of 58%.

The following major safeguards have been incorporated in the Martin system:

▶1. Controllable elements of the system are arranged so that inadvertent feathering of a normally-operating engine is impossible regardless of power setting, airspeed, or altitude. As an additional precautionary measure, a manual "off-on" switch is provided so the system can be rendered inoperative when its protection is not required.

▶2. Electric circuits are designed so that, if one propeller has been feathered (either automatically or manually), the other propeller cannot be feathered automatically even if the live engine suffers a power interruption.

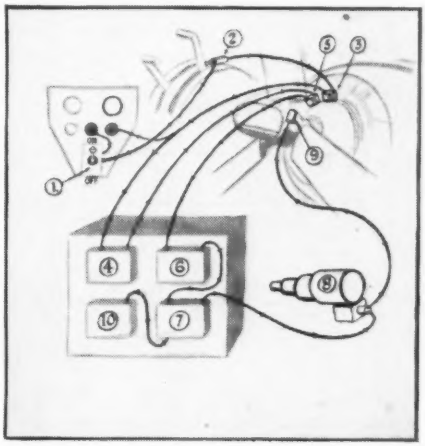


FIG. 1. MAIN COMPONENTS of Martin automatic propeller feathering system. (1) automatic feather switch, when on passes power to throttle limit switch and red auto feather indicator light, (2) throttle limit switch, close by advancing throttle, (3) high torque pressure switch, closes when torque pressure increases to 80 psi, giving armed signal to amber indicator light and armed lock-in relay, (4) armed lock-in relay, locks in the armed signal and passes signal to low torque pressure switch, (5) low torque pressure switch, closes when torque pressure drops below 30 psi., sends feather signal to time delay relay, (6) time delay relay, after 2 sec. delay to discriminate between engine cough and engine failure, sends feather signal to actuating relay, (7) feather actuating relay, starts feathering pump, sends signal to feathered remembering relay, (8) feathering pump, runs until prop is feathered as indicated by (9) pressure cutout switch. (10) Feathered remembering relay locks in when prop is feathered manually or automatically to tell second prop not to feather automatically.

▶3. Appropriate warning lights indicate the system has been turned on and two others (one per engine) indicate that the separate engine systems are armed, or readied.

▶**Major Components**—The major components of the automatic feathering system are shown schematically in fig. 1. The circuit includes only standard electrical components arranged to actuate the normal feathering system and stop the existing fuel booster pumps. This action is taken if after high power has been attained during takeoff, a complete power loss occurs without the throttle having been retarded. Elements sensing engine performance (or engine control position) are:

▶Micro switch in the throttle linkage set to close one leg of the arming circuit when the throttle is advanced to a position corresponding to a low power takeoff.

▶Pressure switch mounted directly on the engine torquemeter pad set to close the other leg of the automatic feathering circuit when the torquemeter pressure reaches 80 psi. (This corresponds to 39.5 in. Hg manifold pressure, and 1,420 hp. at 2,800 rpm).

▶Pressure switch mounted directly on the engine torquemeter pad set to start the automatic feathering cycle if, while the system is armed, the torquemeter pressure drops below 20 psi.

Design of the automatic feathering system is based on the premise that, if, after the throttle has been advanced to takeoff position and the torquemeter pressure has exceeded 80 psi., then torquemeter pressure drops below 20 psi. without the throttle having been retarded, a complete power failure has been indicated. This is a valid premise since the power output at 20 psi. torquemeter pressure is of the magnitude of 300 hp. which is of the same magnitude as the equivalent hp. drag of the windmilling propeller. The sequence of operations following such a drop in torque pressure:

A. *Arming* The system must be turned on manually and armed before it is operable. Arming is accomplished automatically when the following conditions have been fulfilled:

1. The throttle must be advanced to takeoff position. (The system is automatically disarmed when the throttle is retarded).

2. While the throttle is in the arming position, the torquemeter pressure must exceed 80 psi. (The system does not disarm if the pressure subsequently drops below the arming value; it can be disarmed only by retarding the throttle or breaking the circuit manually through the use of the "off-on" switch).

B. *Feathering* Feathering is accomplished automatically if, while the system is armed, torquemeter pressure drops below 20 psi. and stays below 20 psi. for a predetermined time, (tentatively presently set at 2 sec.). The fuel booster pump is stopped simultaneously and automatically to prevent loading the engine with fuel. Inadvertent feathering during low power operation is not possible since torquemeter pressures below 20 psi. will not be attained below the 202's absolute ceilings if the throttle is at takeoff position.

Although this automatic feathering system meets all proposed CAA requirements, it embodies features adjustable to specific requirements of either CAA or airline operators. These features are:

▶ Throttle system microswitch. The exact throttle position at which the microswitch closes is not critical, though it should not be set so high that the system will not be armed during a reduced power takeoff.

▶ High pressure switch (arming switch). Again, the exact setting is not critical but it should not be so high as to preclude reduced power takeoffs. The purpose of this switch is to prevent any possibility of feathering during a throttle burst which could close the throttle system microswitch before torquemeter pressure had built up to 20 psi.

▶ Low pressure switch. If the airplane were climbed to approximately 30,000 ft. (which would require full rated power) and if the pilot then were to retard the propeller governor control to minimum rpm. with the throttle in takeoff position, the torquemeter pressure would drop to approximately 30 psi. The feathering system, if not turned off manually, would be armed. Although the possibility of an operation of this nature is remote, and while the system can be turned off manually when its protection is not required, the feathering pressure switch has been set at 20 psi. to preclude inadvertent feathering even under this extreme condition. Settings of this switch, therefore, should be substantially less than 30 psi. Similarly, settings for this switch should be substantially above zero to allow for torquemeter variations.

▶ Time delay relay. This controls the length of time that torquemeter pressure must be below 20 psi. before the feathering cycle is started. This can be adjusted but it appears that a setting between 0.5 and 2.0 sec. will afford protection against feathering during a momentary power loss and will ensure early initiation of feathering if a permanent power loss has been sustained.

The possibility that engine power may be resumed by some or all cylinders after feathering has been initiated has been considered, and analyses made to determine the powers and BMEPs that could be encountered under this condition. Fig. 2 illustrates a typical power—rpm. schedule that might be encountered under the most extreme conditions (full power takeoff at sea level). If, while operating at standard takeoff power (point A) power is lost completely, torquemeter power and rpm. will diminish rapidly along some path such as AB. At B torquemeter pressure will drop below 20 psi. and the feathering time delay relay will be started. Torquemeter power will diminish to zero (point C) and the rpm. will continue to drop. At some point such as D the time delay relay will instigate feathering.

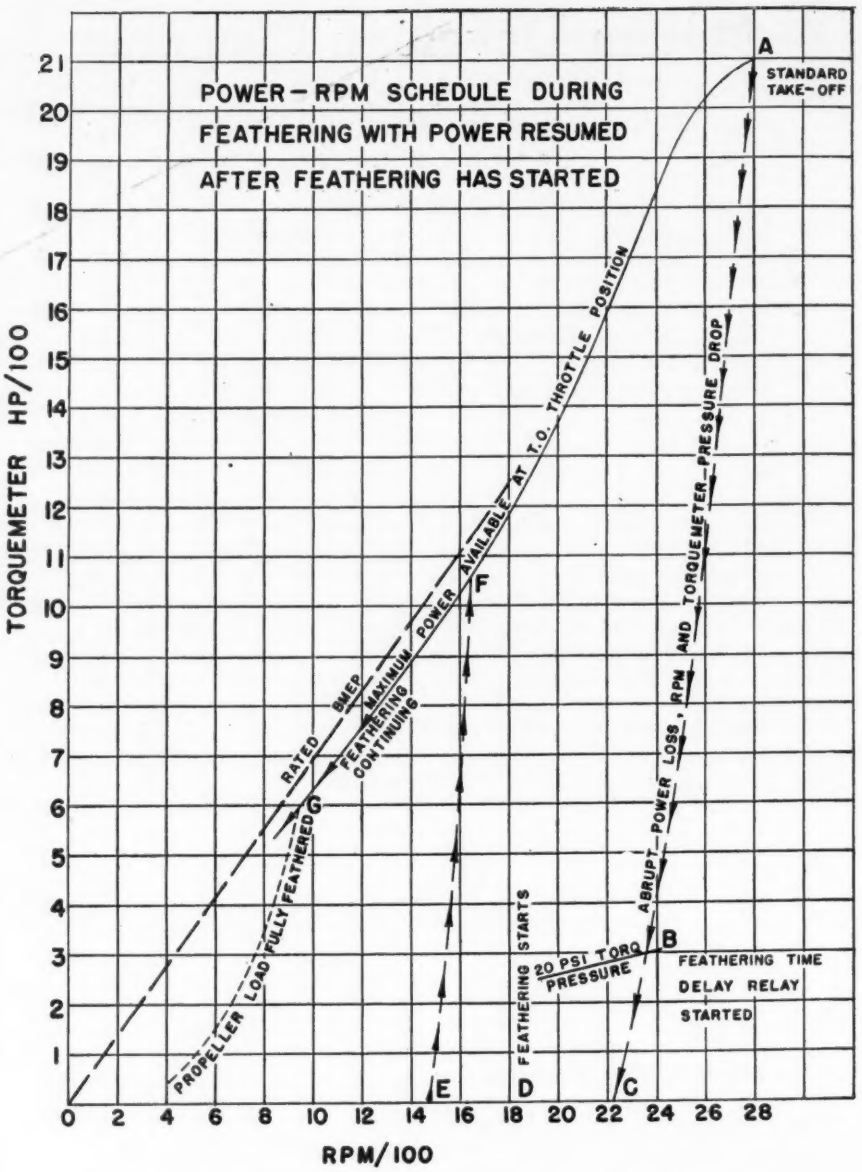
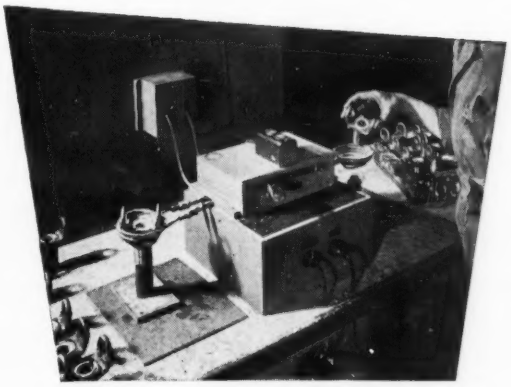


FIG. 2. TYPICAL POWER-RPM. schedule possible under extreme conditions.

Normally, feathering will continue until the engine has been stopped. However, if power is resumed abruptly after feathering has started, feathering will continue but torquemeter power and rpm. will increase along some path such as EF. At F the propeller will be at an intermedite pitch and the power will correspond to the maximum power available at takeoff throttle setting. (The exact location of point F on the "maximum power available at TO throttle position" line will depend primarily on the amount of feathering accomplished prior to the resumption of power.) The propeller will continue feathering until the full feathered position is reached, point G, which is established by the intersection of the power available line and the full feathered propeller load curve. The engine may continue to operate at this point until the pilot unfeathers or retards the throttle. Note that it is virtually impossible for takeoff BMEP to be exceeded, even momentarily, and it is extremely improbable that normal rated BMEP will be exceeded. As mixture control will be in auto rich condition during takeoff and as reduced mixture temperatures will be encountered at lower engine speeds, engine damage due to detonation, preignition, or excessive mechanical torque will not be encountered. This is also applicable to partial power resumption, except that the engine will attemps to stabilize at a lower rpm, and the possibility of engine stalling will be increased. Pratt & Whitney representatives have confirmed that short periods of operation under such conditions should have no deleterious effect on the engine.

IN METAL JOINTS WHERE STAMINA IS VITAL



Cleaned yokes and sleeves come to the operator on a roller conveyer. He applies Handy Flux, assembles parts and preplaces a 1⅜" dia. EASY-FLO ring made of 3/64" dia. wire in each assembly around the end of the sleeve. Heating is done with the 2-coil induction setup above. Time per part, 44 seconds. Loading one coil while the other is heating, keeps production moving in a steady stream.

RINGS OF EASY-FLO silver brazing alloy are being preplaced on the universal joint assemblies shown above preparatory to brazing the yokes to the sleeves ● ● ● With these simple EASY-FLO Rings plus an equally simple brazing procedure outlined at the left, New England Auto Products Co., Pottstown, Pa. puts many times the STAMINA required into their universal joints for cars, buses, trucks and farm units ● ● On the truck universals shown one operator turns out 655 perfectly brazed parts per 8 hour day—every one torque tested at 1540 lb.-ft., a test that far exceeds anything these joints will be called upon to take in service ● ● ● EASY-FLO gives rugged strength like this to hundreds of manufacturers in joining ferrous, non-ferrous and dissimilar metals. And, it gives this strong-as-the-metal-joined strength with surprising *speed* and *economy* ● ● Talk over *your* metal joining problems with one of our field engineers. Ask particularly about the new EASY-FLO 45. For complete details about all the advantages EASY-FLO offers, write for BULLETIN 12-A.

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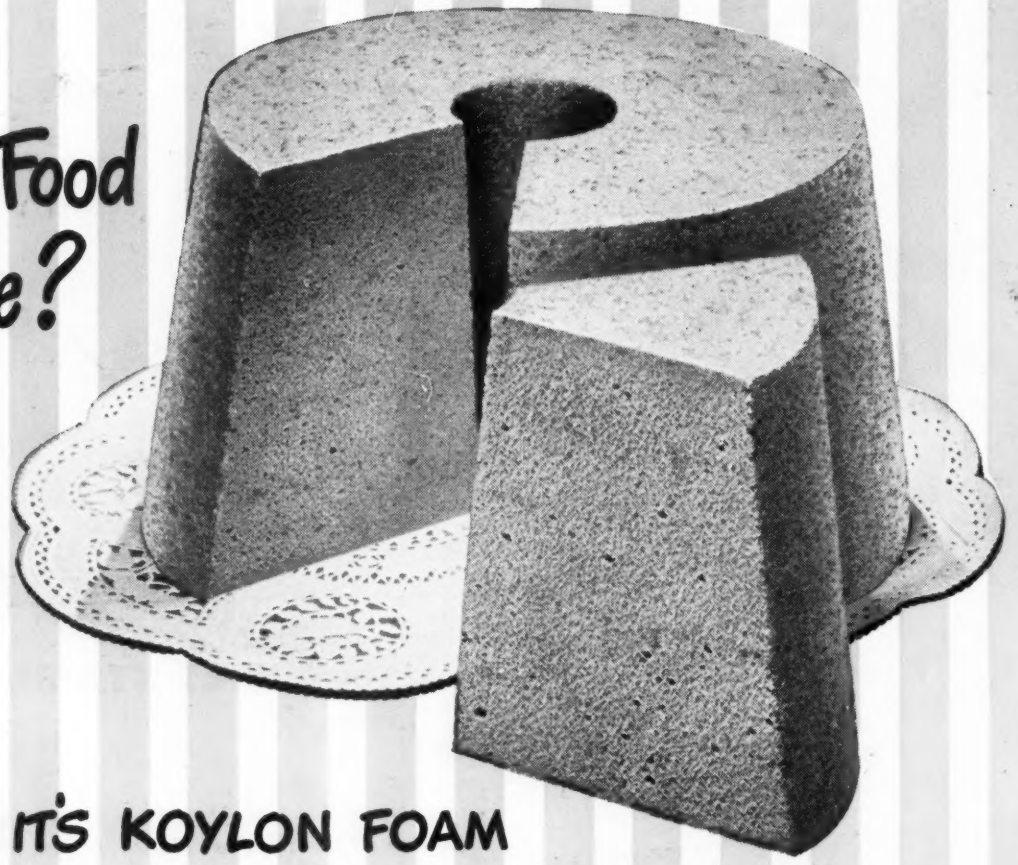
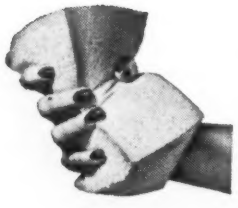
Angel Food Cake?



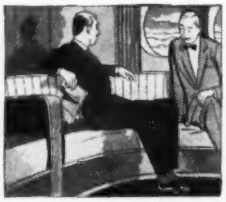
NO, IT'S KOYLON FOAM



IT means *good comfort* instead of good eating, but there's a lot about Koylon that compares with a piece of fluffy cake. This amazing cushioning and mattress material is *light-as-a-feather.* (So easy to handle!) Koylon is *porous.* (Keeps cool because of air circulation!) And, Koylon is made up of *millions of tiny cells* containing *captured air.* (So resilient—yet gently buoyant!)

But, while the comfort of Koylon is gentle—depend on this wonder material to be tough! It has been wear-tested for over 12 years. Wherever you provide the comfort of Koylon you know it's there to stay—another good reason why *it pays to specify Koylon Foam.*

12 years of testing on major railroads prove that comfortable Koylon is long-wearing!



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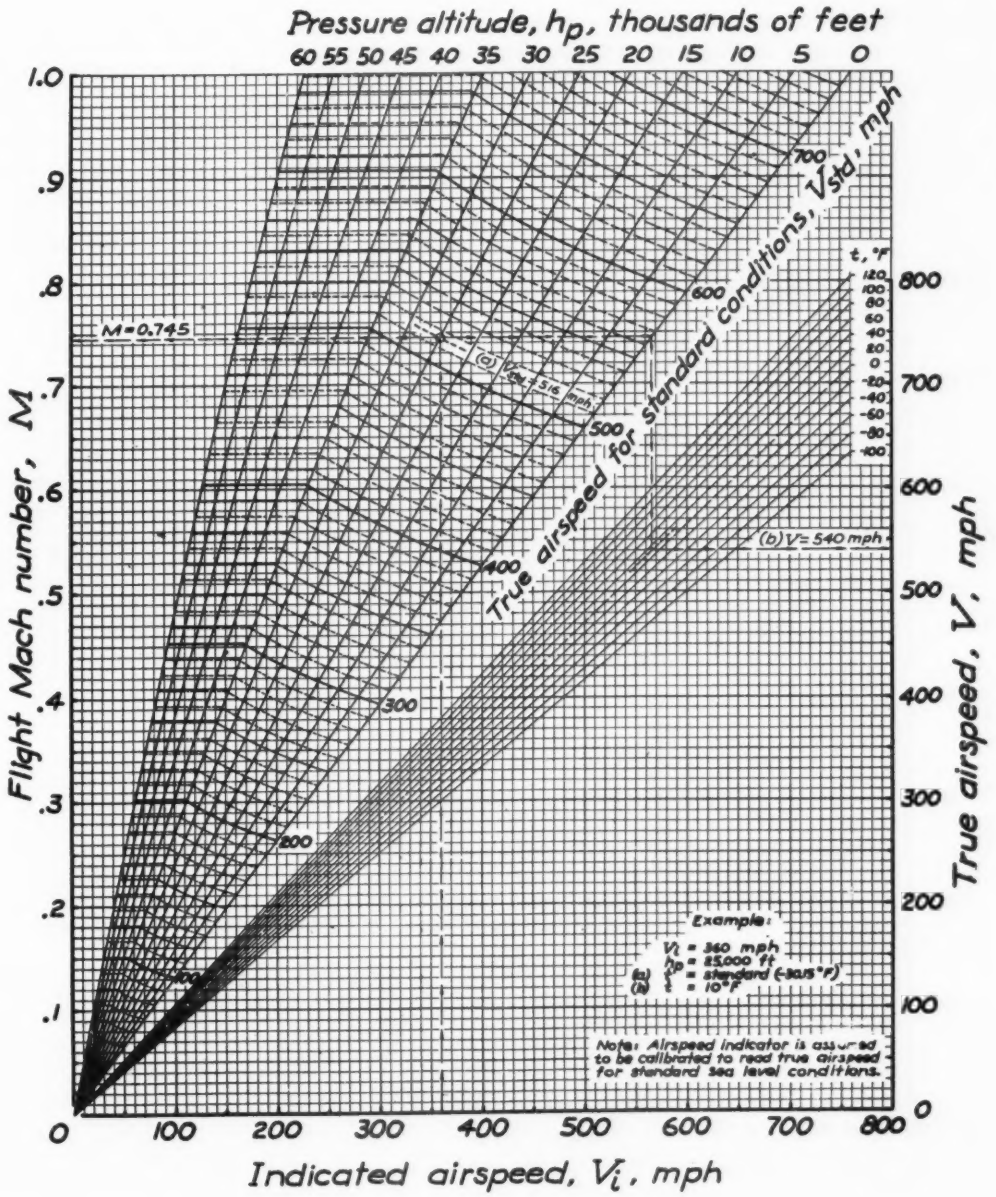
SHEET NUMBER	D-41
CLASSIFICATION	Measurements
SUB CLASSIFICATION	Speed—Mach Values

Airspeed-Mach Number Chart


Pressure altitude, h_p, thousands of feet
60 55 50 45 40 35 30 25 20 15 10 5 0
Flight Mach number, M
1.0 .9 .8 .7 .6 .5 .4 .3 .2 .1
M=0.745
True airspeed for standard conditions, Vstd, mph
700 600 500 400 300 200 100
t, °F
120 100 80 60 40 20 0 -20 -40 -60 -80 -100
(a) Vstd = 516 mph
(b) V= 540 mph
True airspeed, V, mph
800 700 600 500 400 300 200 100 0
Example:
Vi = 360 mph
hp = 25,000 ft
(a) t = standard (-30.15°F)
(b) t = 10°F
Note: Airspeed indicator is assumed to be calibrated to read true airspeed for standard sea level conditions.
0 100 200 300 400 500 600 700 800
Indicated airspeed, Vi, mph

Illustrative example for use of chart in determination of flight Mach number and true airspeed for assumed conditions of 360-mph. indicated airspeed (V_i) and pressure altitude (h_p) of 25,000 ft.; Flight Mach number is obtained by following 360-mph. indicated airspeed value vertically upward to 25,000 ft.-pressure altitude curve, then projecting this point horizontally to Mach scale at left, where value of 0.745 is indicated. (Determination of Mach number by this method is independent of air temperature.)

True airspeed for standard conditions (—30.15 deg. F. at 25,000 ft.) is obtained by reading from intersection of curves of indicated airspeed and pressure altitude diagonally downward to the V_{std} scale, where value of 516 mph. is given.

At non-standard temperature of 10 deg. F., true airspeed for assumed values of indicated airspeed and pressure altitude is obtained by reading from the intersection of the V_i and h_p curves horizontally to the 0, or sea-level, pressure altitude curve. From this point, the reading is projected vertically downward to the 10 deg. F. temperature line, and then horizontally to the true airspeed scale at right, where a value of 540 mph. is indicated. (Chart, by D. D. Baals and V. S. Ritchie, courtesy NACA.)

Exclusive Airport Franchise Opposed In CAA Fund Pact

CAA contends business on fields financed even in past by federal funds must be open to all.

By WILLIAM KROGER

An old and ticklish issue—one guaranteed to start a heated argument in any aviation gathering—has come to life again, for more debate.

It is the question of the right of an airport sponsor to grant exclusive franchises to fixed base operators and other leaseholders on airports which are partially financed by federal funds.

▶ **Problem Ressurected**—CAA resurrected the problem recently, when its long-standing policy opposing exclusive franchises was reasserted in a revision of the agreement which sponsors must make in order to get airport aid.

CAA, backed by a ruling of the Attorney General, contends that business opportunities must be open to all on fields constructed even in part by federal funds. There are signs that not all CAA officials agree with that policy, although proponents of non-exclusive rights still are in the majority.

▶ **Oil Policy**—Petroleum companies generally favor the non-exclusive policy; so do representatives of private pilots; fixed base and airport operators are on both sides of the argument.

Although CAA policy against exclusive rights is long-standing, the matter has assumed major importance recently with stepping-up of CAA grants for airport construction. One requirement for sponsors is that they sign a "sponsor's assurance agreement," originally framed last winter along with the airport regulations. This agreement had a loosely-worded ban against the granting of exclusive rights.

▶ **Agreements Revised**—This section (and others) of the agreements has now been revised, and CAA regional officials, along with aviation groups, were given until today (July 21) to submit comments. As now framed, the agreement provides: "The sponsor will not grant, exercise, or permit the exercise of any exclusive right for the use of the airport for commercial flight operations, including air carrier transportation, for the rental of aircraft, for the conduct of charter flights, for the operation of a flight school, or for the carrying on of any other service or operation requiring the use of aircraft." Exclusive rights for non-aviation concessions, such as restaurants, are permitted.

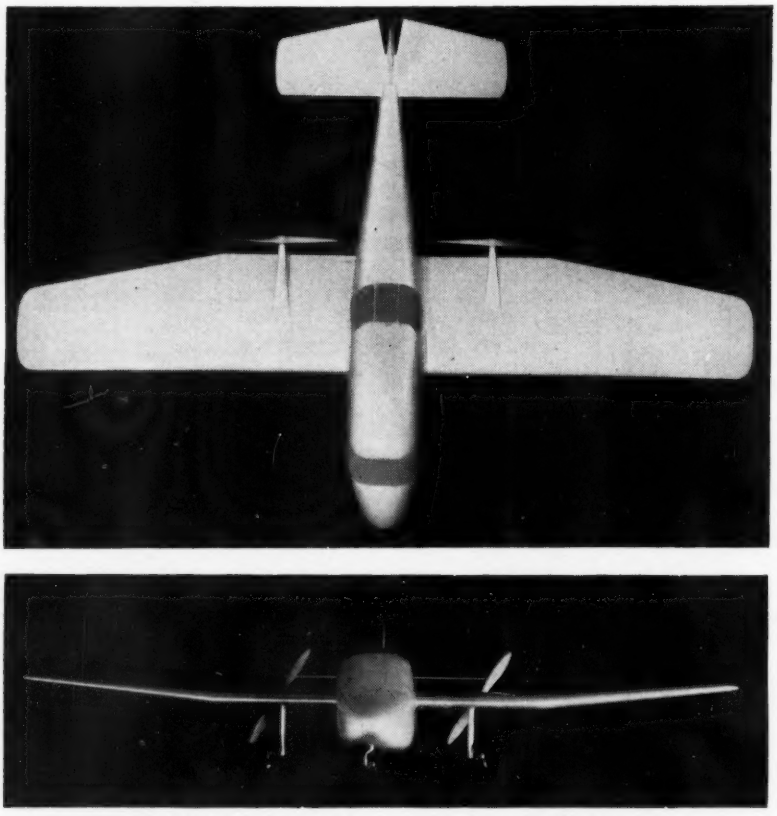
Another section of the agreement reads: "The sponsor will not hereafter grant to anyone an exclusive right to sell aviation gasoline or oil, to sell aircraft or aircraft parts and equipment, or to repair aircraft or aircraft engines."

▶ **Changes Proposed**—As originally written, that section ended after the world "oil." In discussing a revision, some CAA personnel proposed a change that, in effect, would have permitted exclusive rights for the sale of fuel to itinerant flyers, but not to airlines or charter services. That proposal finally was dropped after protest from representatives of private flyers.

Fixed base operators generally oppose exclusive rights, but some have reservations. These point out that there is such a thing as too much competition, that could be injurious economically to a large part of the industry, but which also might affect the safety of operations. There is confusion as to whether a municipality owning an airport built partially with federal funds could even attempt to regulate competition.

On the other side are the operators who have thrived on competition, including those who have emerged on top in a competitive fight, and the consumers who are benefitting from a competitive situation.

▶ **CAA Control Question**—One of the most delicate aspects of the question is the extent to which CAA should attempt to control operations on airports. Importance is being attached to the word "hereafter" in the section dealing with sale of gasoline and oil. Although the federal government supplies part of the funds to construct or to improve an airport, it is up to the sponsor



NORRIS PERSONAL PLANE DESIGN

First photos of personal plane design developed by Eugene W. Norris before he became chief designer for Luscombe Airplane Corp. Designed with fuselage close to ground for passenger comfort, four-five placer would have twin pusher power plants and retractable tricycle gear. Production plans were shelved because of current high costs.

to maintain the field. That puts up to the sponsor the responsibility of operating the field in such a manner as to yield sufficient revenue to cover maintenance and possibly amortization. The terms of the agreement are effective for a maximum of 20 years. But "hereafter" could mean forever.

In some cases, it might be to the sponsor's financial advantage to enter into an exclusive right for some service. The ban on exclusive rights thus in effect is depriving the sponsor of full power over the operation of the field. Whether it is desirable for CAA to have such control is one of the questions puzzling airport experts.

One proposal is that CAA eliminate any mention of exclusive or non-exclusive rights, leaving the matter up to sponsors for decision. It is pointed out, however, that operation of municipal airports is seldom free from local politics, and that a "non-recognition" policy by CAA might invite numerous abuses and discrimination.

Wings Field Gets New Distributorship

Ownership control of Philadelphia Aviation Corp., Beech and Republic distributor in the Philadelphia territory, has been acquired by Wings Field, Inc., through a stock exchange, Guy Miller, president of both companies, has announced.

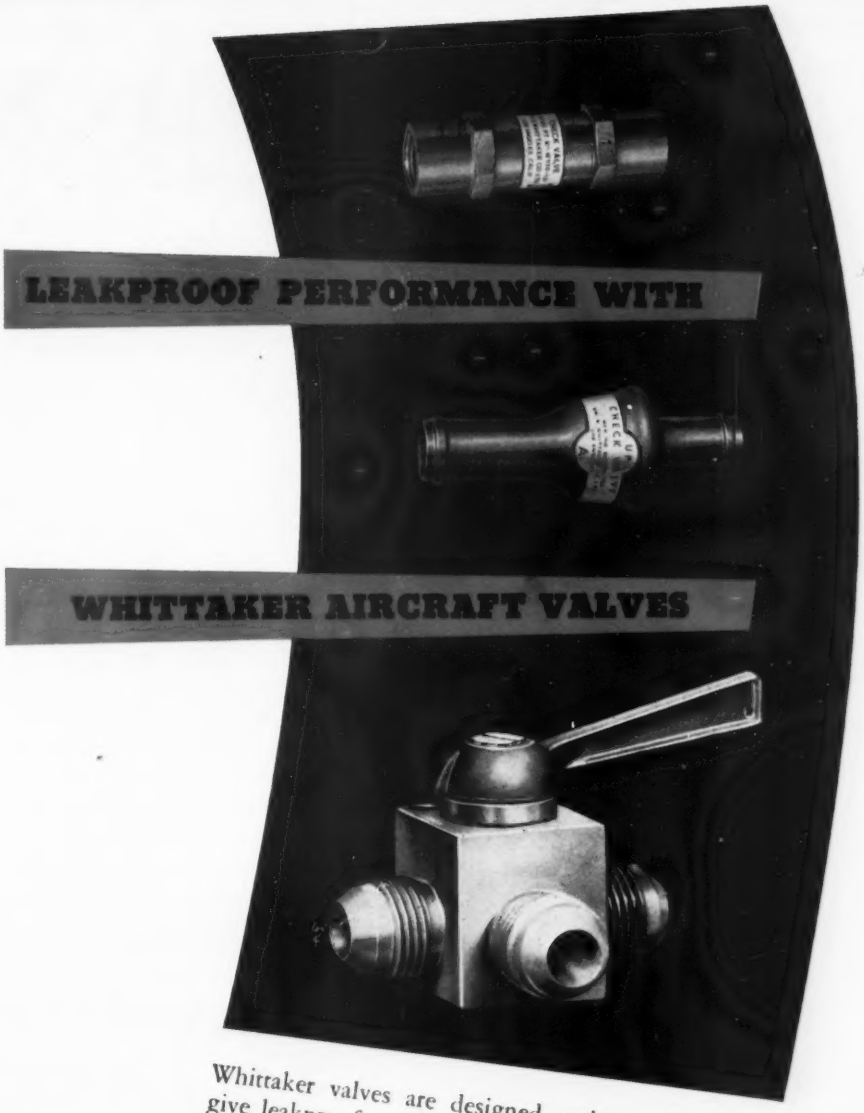
Wings Field, Inc., operating company for Philadelphia's best-known private flyers' airport, will act as dealer for the distributing firm in the Philadelphia metropolitan area for both lines of planes, while the distributor will continue in that function and will continue operation of a Link Trainer ground school. A third company, Philadelphia Air Service, Inc., has been formed as a subsidiary to cary on airplane charter and rental operations.

Wings Field, Inc., operates a flight school, maintenance shop and six hangars, with more hangars to be added soon. Philadelphia Aviation Country Club is located at Wings Field, and a number of twin-engine company planes are based there as well as many private planes.

J. Story Smith is chairman and treasurer of Wings Field, Inc. Associated with Miller and Smith are Edgar S. Davis, vice-president and field manager; Ignatius Sargent, vice-president for wholesale distribution; Donald S. Leas, Jr., vice-president for retail sales. Directors include the above officers and J. A. Harris III, and W. Wikoff Smith.

Michigan Appointments

Appointments of Cass S. Hough, Plymouth, Mich., and Mario Fontana, fixed base operator at Iron Mountain, Mich., as new members of the Michigan Aeronautics Commission, have been announced by Gov. Kim Sigler. Col. Hough, P-47 fighter pilot in the European theater, is vice-president and general manager of the Daisy Manufacturing Co. Fontana has operated flight schools at Houghton and Iron Mountain since 1939.



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Snap-on offers 13 different styles of Boxockets with sizes ranging from 3/16" to 4⅝" for a wide variety of work. Snap-on tools are available through a nationwide, direct-to-user tool service.

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Super Cruisers Try Round World Flight

A round-the-world flight, designed to prove the reliability of lightplanes in unusual conditions of flight, will be made by two Piper Cub Super Cruisers scheduled to take off from New York last week. Pilots are George Truman, 39-year-old motorcycle hill climber, and Clifford V. Evans, Jr., 26-year-old former AAF B-25 pilot.

The 21,350-mile route includes Gander, Greenland, Iceland, British Isles, Europe, Tunis, Bengasi, Cairo, Basra, Karachi, Calcutta, Bangkok, China, Hokkaido, Attu and the U. S. to New York. Longest hop is the Hokkaido-Attu jump of 1,657 miles, which the two pilots hope can be avoided by Russian permission to refuel at Kamchatka, which would cut the distance to 1,000 miles.

The two 100 hp. cub cruisers have been fitted with an extra 100-gal. tank each, giving a total supply of 138 gallons, enough for a 27-hour, 2600-mile range, according to calculations. They will fly formation to permit constant lookout for a forced descent by one of the pilots so the other can continue for help.

The trip will take about 45 days and, if completed, will be the first successful round-the-world lightplane flight, all other such attempts having ended in failure.

PLAN ROUND-THE-WORLD CUB FLIGHT

Clifford V. Evans, Jr., of Washington, D. C. (left) and George W. Truman, of Los Angeles (right) were scheduled to leave New York July 18 on 21,350-mi. round-the-world flight in two Piper Cub Super Cruisers. They are being congratulated by George Brinckerhoff, their former boss at College Park (Md.) Airport, where they were flight instructors.

Fire Destroys Ort Supply House At York, Pa.

Fire loss estimated at well over $100,000 was suffered by Karl Ort, veteran aeronautical supply dealer at York, Pa., recently when flames destroyed his warehouse and offices. Ort is using buildings at the old York airport, seven miles from the city, as his business headquarters until he makes more definite plans about his future program.

Opens Instrument Shop

SMS Instrument Sales & Service, Inc., has opened a CAA-approved repair station at Westchester County Airport, White Plains, N. Y., with complete overhaul, repair and servicing facilities on automatic pilots, gyro instruments and all types of aircraft instrumentation, S. M. Schusheim, manager, has announced. The company is also an authorized Bendix radio dealer. A flat rate instrument exchange plan enables customers to obtain completely reconditioned and overhauled instruments for immediate use.

U. S. Methods Studied

Representatives of 48 countries have visited the U. S. to study civil aviation, according to CAA. Missions have come from practically every nation except our war enemies. They have examined both manufacturing and transport industries. Several nations have sent missions specifically to study the U. S. governmental set-up for civil aviation with a view to emulating it abroad.

Firestone Products Licensed

Firestone Aircraft Company, Akron, will license other aircraft and accessory manufacturers to make Firestone aviation products and will supply the rubber components needed to licensees. Products to be licensed will include wheel and brake units, packaged unit undercarriage using the superflex airspring principle, and the new Firestone cross wind landing gear for tricycle planes developed for CAA. The licensing plan will not affect continued expansion of Firestone aircraft and accessory distribution through local airport "stores" nor will it curtail the Firestone helicopter program.

About Helicopters

For those who don't understand exactly how a helicopter works, the Helicopter Council of Aircraft Industries Association has prepared a booklet which shows how it flies and what it can do, with graphic illustrations. Planned as part of the Council's program to educate the public on the need for treating the helicopter as something different from a fixed-wing aircraft, the booklet is being sent to some 5,000 local, state and federal officials and others who should understand about helicopters. Still other copies will be distributed through the helicopter manufacturing companies which are members of the Council, and through helicopter operators.

New Details Reported On Sailplane Ballast

Additional details on the water ballast system employed in the new Schweizer SGS 1-21 reveal that the additional 270 lbs. of weight increases the cruising speed of the high performance soarer about 7 miles per hour. Major advantage of the new system is added range under headwind conditions. Under no-wind and tailwind conditions, the water is dumped through flush valves and the lower wing loading restores the basic sinking speed of the sailplane. This added adaptability of the 1-21 to varying conditions improves its cross-country record chances, according to Ernest Schweizer, its designer.

Integral water tanks are created by the use of water-tight ribs and sealing compound in each wing panel leading edge, about one-third span out from the cockpit. Dump valves are cable-operated from the cockpit.

Flush riveted aluminum alloy is used extensively in the 1-21 and careful attention has been paid to drag reduction to realize the potential gains of the water ballast theory.

Two sets of spoilers are used, one of them a double-spoiler set to reduce the approach speed and the other a separate set connected to the wheel brake to cut the landing run to a minimum, thereby enabling the 1-21 to set down in otherwise inaccessible fields.

The SGS 1-21 has a span of 51 ft., wing area of 165 sq. ft., aspect ratio of 15.75 and a maximum flying weight of 990 lbs. with ballast.

CAA Shifts Its Airport Emphasis

Faced with the necessity of cutting in half its proposed work on large airports, CAA is re-analyzing its airport program to attempt to fit it into the $23,500,000 appropriation granted for the current fiscal year—one-half of the amount originally requested—and to provide runways offering a greater margin of safety for four-engine planes.

Scope of the revised plan, which will be disclosed later this month, will be determined to a great extent by the Presidential Safety Board's recommendations which, in effect, limit four-engine aircraft operation to runways 4,000 ft. or more in length.

▶ **No Estimate**—Another possible factor in the re-studying of the construction program is the runway classification according to use and weight of aircraft, suggested by CAA some time ago.

Pending re-determination of the program, CAA last week would not estimate the extent of the changes to be made in the original plan to improve 297 airports in the continental U. S. at a cost of $65,000,000. The new program probably will be primarily concerned with Class IV and larger fields, although there was some indication that Class III and smaller fields may be affected. Distinguishing thing about the programs for the two categories is that CAA already has had available in fiscal 1947 and has tentatively allocated more than $30,000,000 for work on Class III and smaller fields.

▶ **Revise List**—The program to improve Class IV and larger fields was subject to Congressional approval. In May, when it became apparent that CAA would be given only one-half the funds it requested for Class IV and larger fields, Secretary of Commerce W. Averell Harriman estimated that the reduction would eliminate one-half of the projects on the list and leave CAA with a backlog of grant-in-aid requests totaling $180,000,000. Harriman listed the projects that would be eliminated or reduced in size. This estimate will be revised in CAA's present thorough-going re-study of the situation.

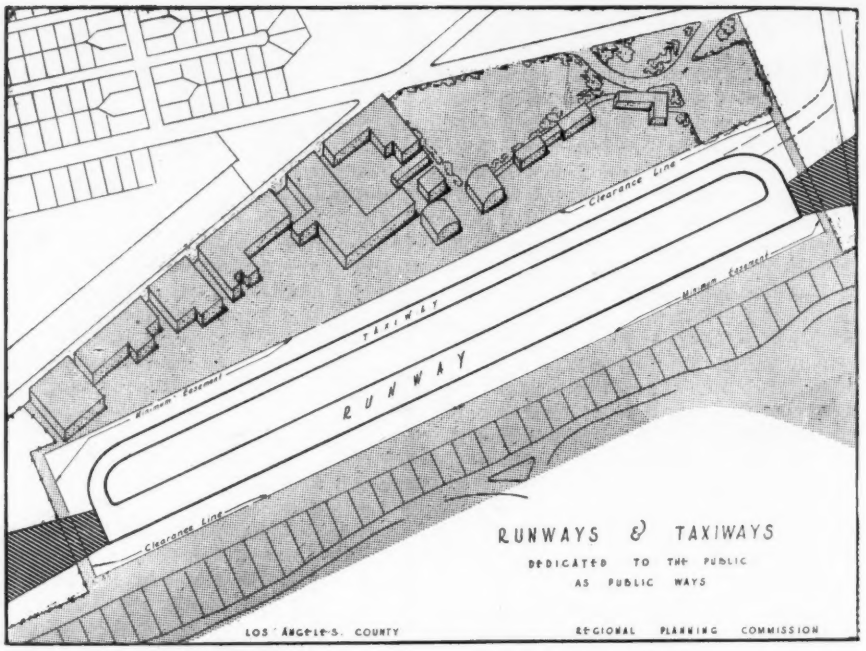
As of June 23, last date for which figures are available, there were 186 airports approved for operation of four-engine equipment. Of these, only 77 were in use. Of these 77, it is shown by an AVIATION WEEK analysis, 32 have one or more runways that are under the sea level equivalent of 4,000 ft. long or are marginal. Of the total of 186 four-engine fields, 75 are in that category.

▶ **Propose Improvements**—CAA originally proposed improvements at 135 of the 186 four-engine fields. Under the Harriman estimate, 58 of the 135 would be dropped from the program. Of the remaining 77, funds available for 28 would be reduced, and 49 would not be affected by the cut.

The critical nature of the runway situation can be illustrated by examining the 32 fields now in use for four-engine airplanes, but which have runways less than the sea level equivalent of 4,000 ft. There were 24 of these fields included in the original improvement program. On the basis of Harriman's statement nine of these would be dropped, nine more reduced in scope, with the only six of the 32 unchanged. Three of those six are scheduled for improvement under the Class III and smaller program, so would not be affected by the Congressional paring of the $65,000,000 request.

As originally set up, the program for larger fields included few projects for extension of, or additional runways. In most cases, expenditures would have been for terminal buildings, taxiways, approach clearance and parking areas.

It is highly probable that this aspect of the airport program also will be included in the present CAA study, with a logical expectation that the proposed work will be changed to include greater emphasis on runways.



PUBLIC RUNWAYS AND TAXISTRIPS

Los Angeles County regional planning commission is studying proposal for public dedication of runways and taxistrips, because of diminishing number of landing facilities in high density population zones. Such a public runway as envisioned in sketch, prepared by Col. William J. Fox, commission's chief engineer, could be maintained by aviation gas tax funds, and might result in considerable building development in adjacent areas as shown in shaded portion of sketch, Fox suggests.

NAVION IN BUSINESS

Three advertising agency executives piloted by Rex Howard, Peoria, Ill., midwest Navion distributor, use North American Navion in business contacts with speed otherwise unobtainable. Kuttner & Kuttner's radio director Larry Kurtze, promotion manager Robert Schoenbrod and C. D. Kuttner left Chicago at 10 AM, held luncheon conference 172 mi. away at Michigan City and returned for Chicago conferences that afternoon.

THE PLANE . . . *by* STINSON

. . . the seating

CUSHIONED WITH

FLY LIGHT

Nukraft

The luxurious cabin in Stinson's new 1947 Voyager gives passengers and pilot the ease and comfort they appreciate on cross-country trips. And those soft long-wearing seats are cushioned with Nukraft . . . the patented figure 8 hair-latex cushioning.

"FOR SOLID COMFORT"

Nukraft—available with or without foam rubber topper pads—is the miracle cushioning that adds extra comfort—extra life—to seating. It can be precut to any size or shape, if desired, and can be sewed, tacked, or tied into position. Best of all, its use is economical. Write today—find out how fly-light Nukraft can help you.

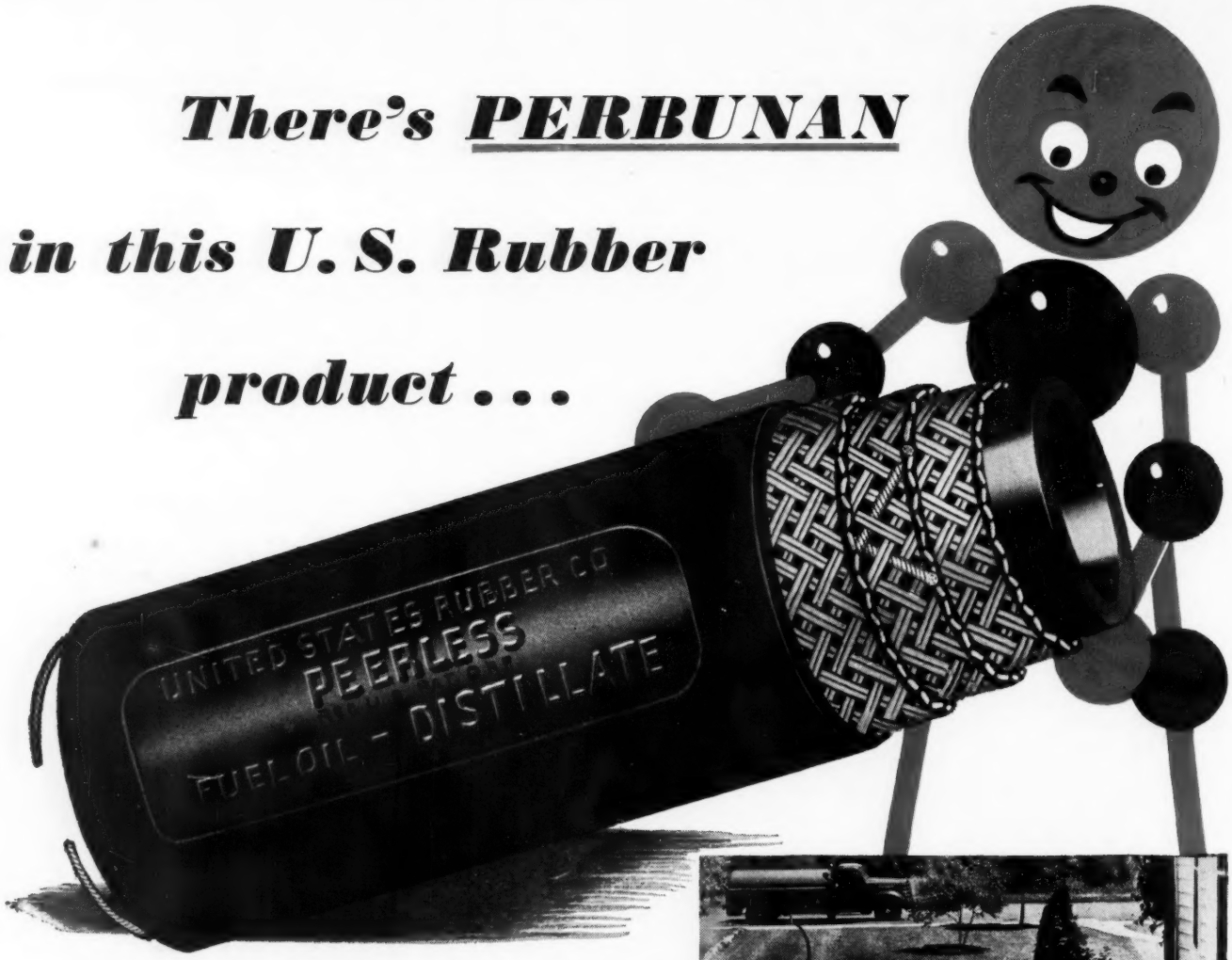
Photos courtesy Stinson Aircraft Corporation

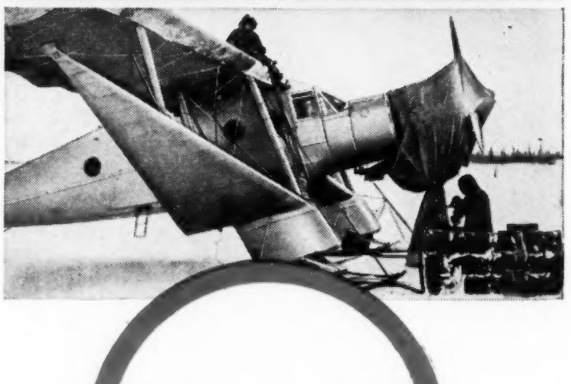
Nukraft
SHELBYVILLE, IND.

MANUFACTURING CO., INC.

CABLE ADDRESS:
NUKRAFT—Shelbyville—or PAULHAREX—Chicago

There's PERBUNAN *in this U. S. Rubber product . . .*





Perbunan was selected by United States Rubber Company engineers and technicians for the tube of their U. S. Peerless Fuel Oil-Distillate Hose because of its

- *Ability to handle a wide variety of petroleum hydrocarbons . . . ranging from fuel oil to aviation gasoline.*
- *Aging qualities required for a* rugged, *long-life hose . . . one that is adaptable for either home fuel oil delivery, or for airplane refueling.*
- *Flexibility . . . in sub-zero weather . . . and trouble-free service on hottest summer days.*

Perbunan now contains a *new stabilizer* that permits it to be used in delicate colors where good color stability during service is desirable.

If you have any rubber parts problems, call on our rubber technologists. They will gladly cooperate. Or write to the nearest address below.

For Improved Rubber Parts . . . specify PERBUNAN

Resists damage from water, oil, excessive heat, abrasion and petroleum hydrocarbons . . . retains flexibility at sub-zero temperatures!

ENJAY COMPANY, INC. (Formerly Chemical Products Department, Stanco Distributors, Inc.) 26 Broadway, New York 4, N. Y.; First Central Tower, 106 South Main Street, Akron 8, Ohio; 221 North LaSalle St., Chicago 1, Illinois; 378 Stuart Street, Boston 17, Mass. West Coast Representatives: H. M. Royal, Inc., 4814 Loma Vista Avenue, Los Angeles 11, California. Warehouse stocks in Elizabeth, New Jersey; Los Angeles, California; Chicago, Illinois; Akron, Ohio; and Baton Rouge, Louisiana.

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PERBUNAN
REG. U.S. PAT. OFF.

THE RUBBER THAT RESISTS OIL, COLD, HEAT AND TIME

High-Power Dusters Operated in Idaho

Because of the high altitudes of airfields in Idaho, the 18 crop-dusting pilots who fly for Farris Lind of Boise, like power in their airplanes.

So Lind, who operates as Fearless Farris Crop Control, Inc., has taken eight Boeing PT17 surplus trainers, which used to have 220 hp. Continental engines as powerplants, and has more than doubled the power. The replacement powerplants in the PT17s are war surplus like the planes themselves. They are 450 hp. Pratt & Whitney Wasp Jr. engines, some of them obtained in surplus BT-13s which sold complete as low as $200.

Total cost of the high-powered duster is estimated at less than $1500 exclusive of special equipment and NX and NR licensing.

Shortened engine mounts were necessary for the engine change, and the starters had to be removed so that the duster pilots have to spin the props by hand to start the engines, a considerable task on a 450 hp. engine.

Since Lind adopted this equipment a year ago, he has lost neither planes nor pilots, a record unusual in this hazardous profession, which is additionally dangerous in the higher altitudes of his area. But with extra power, it is not unusual for a pilot to lift one of the 450 hp. Boeing dusters out of a cow pasture with 900 lbs. of DDT aboard, and clear a 75 ft. row of trees with room to spare, little more than 1,000 ft. from the takeoff point.

The extra power has served the dusters well on numerous occasions when their down-to-earth flying caused them difficulties. Horace Mitchell, chief pilot, reports on the plane which hit a five-wire electric line near Howe, Idaho, cut every wire and after faltering momentarily, picked up on full throttle and flew out. Beyond some propeller nicks and minor cuts and burns on the fuselage and wings the plane was undamaged and has continued flying without repairs. Other planes of the same type have cropped as much as six feet out of the tops of trees with their propellers, and mowed willow tree tops for about 50 yards along a canal bank, without serious harm to the planes. Mitchell discourages any and all of these practices, but points out that the low altitude flying necessary for certain types of dusting, makes such incidents almost unavoidable occasionally.

Fuel consumption averages 24 gallons an hour, with the Wasp Jr. but the fields it makes usable, the loads it will carry and the additional safety for the pilot, offset this operational cost, to make the plane the most economical that Lind has operated from an all-round basis.

Idahoans expect a considerable increase in crop-dusting operations with similar high-powered dusters, which will function in areas and at altitudes where lower-powered aircraft have proven impractical.

MORE POWER TO A DUSTER—Farris Lind, Boise, Idaho, aerial crop duster, has a fleet of surplus PT-17 Boeing primary trainers, which he modestly claims are the best dusters in the world, since he has replaced their original 220 hp. Continental engines with 450 hp. Pratt and Whitney Wasp Jr. engines, more than doubling the horsepower. Combination of plane and engine costs less than $1500 due to surplus prices, except for the special added equipment. Photos show: close up of re-engined trainer with Chief Pilot Horace Mitchell gassing up, and the short takeoff made possible by the extra power. (Bob Arentz photos)

Florida Airport Licenses

All private airports in Florida must apply for their first annual license by July 31, in accordance with the regulations adopted under the state's new airport licensing act which went into effect the first of this month. About 95 airports come under the act.

Fee for the first year will be $50 for fields used for commercial operations, and $10 if used only by owner or tenant. The $50 is the maximum permitted by the law, and the State Improvement Commission, which administers the act, hopes in subsequent years this figure can be cut in half. For establishment of a new airport, an extra $50 will have to be paid as a site approval fee.

After Aug. 1, no airport may be established without approval of the commission and the field must be personally inspected by a representative of the Commission before it can be licensed. After the July 31 deadline, no plane can take off from or land on an unlicensed airport except in case of emergency.

Plane Registration Gains

Canada had 72 private planes registered at the end of 1946, it has been disclosed for the first time by the Department of Transport.

Forest Spraying Program Successfully Completed

Largest aerial spraying program in the Northwest, covering 413,469 acres of forest in Oregon, Washington and Idaho, has been one of the most successful of its type, federal authorities report.

Planes and helicopters of Central Aircraft Corp., Yakima, Wash., and Johnson Flying Service, Missoula, Mont., undertook the project jointly. The operators will receive approximately $240,000 at a contract rate of 58.5 cents an acre.

James Evenden, federal entomologist, reported that intensive searches by ground crews after the spraying, had failed to disclose any trace of living tussock moths, the insect pest against which the spraying attack was aimed.

100th Florida Airmarker

Florida has completed restoration of the 100th airmarker of the 1,081 it had before wartime security required obliteration.

In explaining that it would require between $90,000 and $100,000 to renew all of the markers, State Aviation Director W. C. Lazarus reported that Sen. Claude Pepper had enlisted the support of congressional delegations from 13 states for a bill which would re-imburse states for airmarkers destroyed by the federal government during the war.

Should the bill fail of enactment before the adjournment of Congress, an effort may be made to reclaim the prewar airmarking expense through the court of claims.

Cessna Model 170

Cessna Aircraft is going ahead with development of its Model 170, a four-passenger, high-wing personal plane which it hopes to market under $5,000. It will be powered by a 150-hp. engine and in size will be half-way between the 140 and 195. Decision to continue came after a market survey revealed many customers looking for a four-place plane under the $5,000 bracket. Engineers say only it will be a better-than-100mph airplane.

Ryan Begins Navion Parts Distribution

Ryan Aeronautical Corp., San Diego, was to start handling spare parts orders last week for the four place Navion personal plane, with expectations that the company would be in production at San Diego on the former North American plane within two to three months, probably by October. Until that time deliveries will be made from finished planes in stock at North American Aviation, Inglewood.

Job of transferring tooling and materials purchased from North American by Ryan to the San Diego plant will require about 500 12-ton truck loads and will not be completed until September. Production executives of Ryan and North American have been working for several weeks planning the transfer and the Navion production setup at Ryan which is expected to have a 10-plane-a-day capacity.

▶ **Retain Dealer Plan**—T. Claude Ryan, president, said that the basic North American dealer organization would be used but plans are being studied for strengthening and extending distribution.

The name Navion will be retained because it is already well established, but future advertising and promotion marketing will refer to the plane as the "Ryan Navion". The same advertising agency which has handled the Navion account since its inception—Batten, Barton, Durstine & Osborn—is expected to be retained, with Robert Schmelzer as account executive. The Navion promotion will continue to stress the plane's business use, and a slogan "Navion—The Plane that Means Business!" will be used in the initial phases of the Ryan advertising program.

▶ **No Basic Changes**—Ryan said his pilots and engineers had made a thorough study of the Navion and recommended that no changes in the basic airplane structure be made. Some design refinements may be expected as customer preference in minor features is established, but the basic design is so advanced that it will be modern for an extended period of time.

Lanter Named as CAA Training Head

Appointment of Fred M. Lanter, former director of CAA safety regulations, as director of CAA Aeronautical Center, Oklahoma City, training center for CAA personnel, was viewed by Washington observers as a victory for the "old guard" in the Federal agency.

Lanter was one of the strongest opponents to efforts for liberalizing the CAA regulations governing the private pilot during his term as safety regulations director from October 1942 until last September. He was transferred at that time to Atlanta as regional CAA administrator.

Effect of the Lanter appointment on the training of new CAA employes presumably will depend largely on how much actual responsibility and authority his new position holds. Since much of the CAA regulatory procedure is a matter of interpretation by the individual inspector, or other official, the training of these officials in a liberal or harsh interpretation of the rules as they affect the flyer, instructor, operator, mechanic, and manufacturer, may have a drastic effect on the entire regulatory setup.

Other CAA personnel shifts announced simultaneously with the Lanter appointment:

▶ William M. Robertson, formerly assistant administrator for foreign operations, named to succeed Lanter at Atlanta. (Robertson's foreign operations post was discontinued in the interest of economy, with employes transferred to other duties or separated from service.)

▶ F. W. Devlin, was advanced to executive assistant to T. P. Wright, Administrator of Civil Aeronautics, succeeding F. B. Lee, recently named a deputy administrator. Devlin has been program planning officer, was associated with Consolidated Vultee and other aircraft companies in engineering and administrative work before coming to CAA in Feb. 1946.

Both Robertson and Lanter have been with CAA and predecessor agencies since 1929, joining the Department of Commerce as aeronautical inspectors in that year.

Airport Liquor Poll

Indianapolis Aviation Commission is polling other airport managements throughout the country to find out how many operate cocktail lounges or other alcoholic beverage vending concessions, and what their experiences with the business have been.

The poll followed application of Leo Hurley, airport restaurant operator, for authorization to open a cocktail lounge in addition to the restaurant. County Liquor Board has expressed the opinion that nothing stronger than beer could be sold under the provisions of the state liquor law, since the airport is outside the Indianapolis city limits.

Airport Increase

A sizeable jump in both registered aircraft and airports during the past 12 months is reported by CAA, with a better than 80 percent increase in aircraft, and a rise of about 20 percent in airports.

Airport and aircraft picture as of June 1:

	1947	1946
Airports in Operation	5,074	4,268
Commercial	2,383	1,718
Municipal	1,612	1,308
CAA Intermediate	189	211
Military	660	857
All Others	230	174
Total Registered Aircraft	92,348	52,899
Scheduled Air Carrier Aircraft	888	687

Asks Helicopter Amendment

Amendment of a city ordinance which prohibits the landing of helicopters within the city limits and organization of an agency which would process applications to operate helicopters from designated spots in Buffalo have been asked of the Buffalo airport advisory board by Leston P. Faneuf, administrative assistant to the president of Bell Aircraft Corp.

Faneuf asserted Buffalo now is "the only large city we know of where landing within the city limits is completely prohibited."

"This is a strange paradox," he said, "for the city which is the home town of helicopter manufacturers. In Buffalo not only is the landing prohibited, but also there is no one who can grant permits as in the case of other cities."

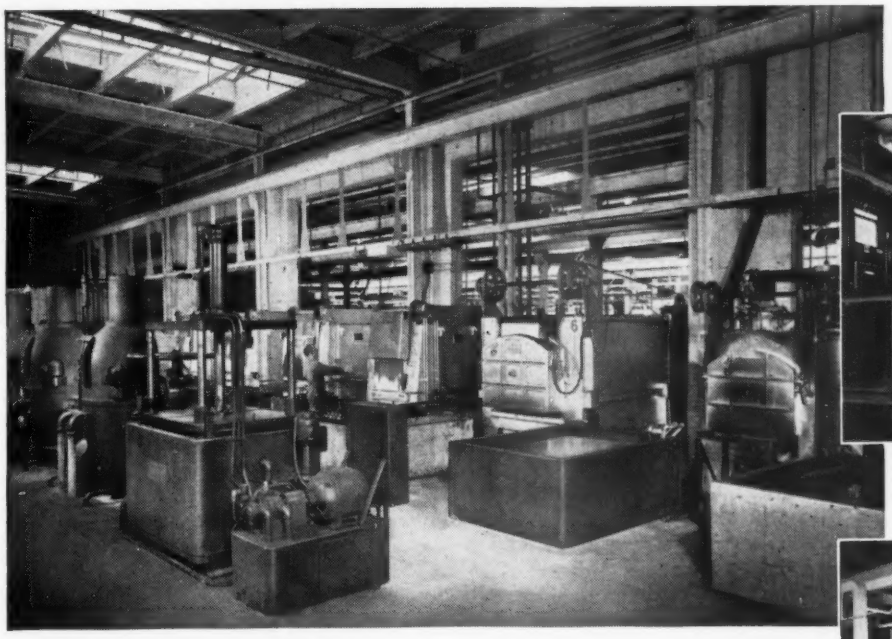
Mr. Faneuf emphasized "We don't want indiscriminate landings, but we do feel there should be specific spots where helicopters could land."

Hawaii Air Director

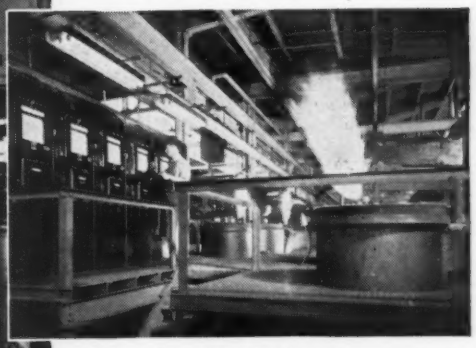
Robert L. Campbell has been named director of aeronautics for Hawaii's new Aeronautics Commission, effective July 1. Campbell, vice president and general manager of the Andrews Flying Service, Ltd., will take over duties now performed by Leslie J. Watson, manager of airports for the territorial department of public works. That agency is turning its aviation functions over to the new commission.

Appointed commission members are Glen T. Belcher, chairman; O. J. Burnett, vice chairman; Ralph Honda, secretary, Chauncey B. Wightman and R. A. Anderson. Two members are yet to be appointed. Campbell was assistant airport engineer at San Francisco Airport and airport engineer for the Bureau of Air Commerce in seven western states before moving to Hawaii in 1936.

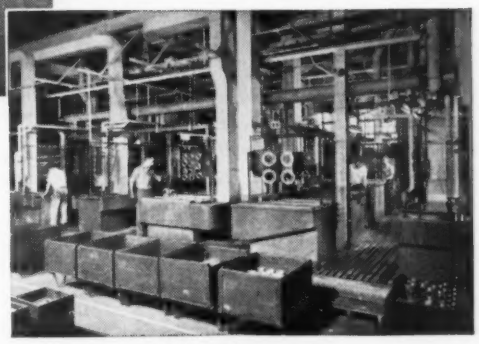
FACILITIES TO PRODUCE THE *Gears* YOU NEED



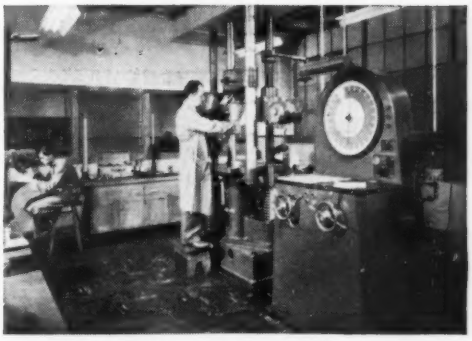
Controlled atmosphere furnaces; quenching presses in the foreground



Carburizing and nitriding furnaces



Section of plating department



Physical testing laboratory to provide control of heat treating

. . . take heat treating for example

If you use gears—spur—helical—worm or bevel—Foote Bros. can fill your needs. In two large plants, you will find the latest in modern machinery backed by nearly a century of manufacturing skill to produce gears for practically every requirement. Giant gears 20 feet in diameter for cement kiln or sugar mill drives. Extremely high precision gears for aircraft engines. Industrial gears for gas or diesel engines, tractor transmissions, mining and construction machinery, machine tools or any industrial application.

Typical of the completeness of the facilities of Foote Bros. is the heat-treating department.

In this department are facilities to bright copper plate—Rochelle salt copper plate—cadmium plate—tin plate and dichromate.

Here are carburizing and nitriding furnaces to gas carburize, liquid carburize, cyanide and nitride.

Controlled atmosphere furnaces permit exact control of hardening. They normalize to relieve forging stresses and anneal and temper to provide stress relief after hardening or grinding.

In addition to heat-treating equipment, this department has Gleason and Hannifin Quenching Presses for distortion control—facilities for sub-zero treatment—and facilities for shot peening to increase fatigue life.

The completeness of heat-treatment control is an indication of facilities in every department of Foote Bros. available to gear buyers. We welcome inquiries for any type of gear in any quantity to meet your needs.

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FOOTE BROS.

Better Power Transmission Through Better Gears

Three bulletins on Foote Bros. products are available. Check the coupon for the ones you are interested in.

☐ FOLDER "WHATEVER YOUR NEEDS IN GEARS"
☐ BULLETIN "AIRCRAFT QUALITY GEARS"
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Name.....

Address.....

City.....*State*.....

Sales and Service Operations Started

▶ **Anthony Mangine,** Jamestown, N. Y. commercial pilot, and seaplane service operator at Chatauqua Lake, has offered to rent a hangar vacated by Fairchild Duramold Division at Jamestown Airport, under a five year lease for a commercial airport operation. The hangar, valued at $250,000 is part of the former American Aviation Co. installation, valued at a total of $1,250,000.

▶ **Taylorsville Flying Service, Inc.,** Taylorsville, N. C., has been incorporated with $25,000 capital stock, by A. E. Watts, Jr., H. M. Deal and Rayford Deal, to operate airplanes for transportation.

▶ **United Aero Service, Inc.,** Charlotte, N. C., has been appointed distributor of General Electric Company's aviation electronic equipment.

▶ **Rawdon Brothers Aircraft, Inc.,** has been chartered at Wichita, Kan., with authorized capital of $250,000 to continue the flying service and to expand facilities for complete aircraft sales and service, maintenance, charter and flight instruction. Gene Rawdon was designated resident agent.

▶ **Wilson-Fairchild Dusting Co.,** New York, has been chartered with 200 shares no par stock capital, for purpose of controlling insect pests by spraying from airplanes. Subscribers are Anne and Stuart Speiser, 875 West End Ave., New York, and Helen Price, 345 West 45th St., New York.

▶ **William and George Northey,** former Navy and Army pilots respectively in World War II, have opened a crop dusting service for farmers in the Snohomish, Wash., area, using two Piper Cubs based at the Snohomish airport.

▶ **Pleasure Tours, Inc.,** Milwaukee, has opened a vacation air service to northern Wisconsin, using a 21-uassenger DC-3 which makes three round trips a weekend from Milwaukee to Rhinelander and Land-O-Lakes, with charter trips during the remainder of the week, Arthur Hinke, director of the service has announced.

▶ **Kinston Flying Service,** Kinston, N. C., has been chartered with $100,000 authorized capital stock, with Mercer Parrott, Jr., Edward King and John Parrott as subscribers.

▶ **White Flying Service,** operated by Alva N. White at Brownwood, Texas, has leased the Llano, Texas, municipal airport for exclusive operation. White plans to erect steel hangars and establish a flight school for GI training.

▶ **James Peters,** and William Peterson, Farragut, Idaho, pilots have contracted with the U. S. Forest Service to fly daily patrols over the Coeur D'Alene national forest this summer using a Stinson Voyager and a Piper Super Cruiser, looking out for forest fires.

BRIEFING FOR DEALERS AND DISTRIBUTORS

AIRSTRIP PROPONENTS WIN—Appropriation by the Milwaukee Common Council of $200,000 for improvement of the city's downtown landing strip, Maitland Field, scores a definite victory for the close-in airpark proponents, and insures that Maitland Field will be used as a landing facility for the next 10 years at least, which should be time enough for it to demonstrate its utility. Francis Trecker, businessman flyer, and leader in the fight to prevent the airstrip from being used as a harbor adjunct, reports ground will be broken on improvements including a paved 3,200 ft. runway and a helicopter landing area, as soon as assurance of CAA's matching $200,000 for the project is obtained.

JOB FOR ENGINEERS—Jerome Lederer, safety engineer for Aero Insurance Underwriters, says that engineers and designers should have a target for their designs of personal planes to eliminate 65 percent of the fatal accidents, since only 35 percent of fatalities are attributable to reckless flying. The others are caused by normal human mistakes comparable to burning the toast, jaywalking and overeating. The engineer is handicapped, because he is trained to be analytical and careful, and expects all reasoning human beings to act likewise. He should remember, says Lederer, that the average person for whom he designs a plane is careless, impatient, lacks time to maintain pilot proficiency, and is not accustomed to exercising continual conscious judgment in operation of mechanical contrivances. The engineer's goal should be to eliminate as far as possible the need for the airmanship required to operate the present day plane safely.

AEROMATIC SALES REPORT—Sid Fedan, Aeromatic Propellers manager, Baltimore, reports delivery of 1,317 of the variable pitch propellers in the first six months of 1947. Model F-200, the basic unit for 85 to 165 hp. engines, was sold in order of quantities for the Piper Super Cruiser, Stinson Voyager 150, Bellanca Cruisair, Ercoupe, Swift, Navion and Fairchild F-24. Model 220, a larger unit for 155 to 245 hp. engines went on the Navion and Fairchild, and also on the Grumman Widgeon and Rocket 185. Foreign Aeromatic sales includes an order for 115 Model 220s for use by the Dutch firm of Frits Diepen on the four-place Diepen-Fokker F-25 Promoter, an order by the French SEPA for the 140 hp. four-seater Norecrin, an order by the Swedish Skandinavisk Aero for the two-place 125 hp. Lark, and an order from the Chinese Air Force for Aeromaster ground adjustable propellers for Boeing primary trainers.

DEALER INTEREST—Former Culver dealers and distributors, and other airplane sales organizations are showing considerable interest in the production future of the Mooney Aircraft one-place plane designed by Al W. Mooney, former vice-president in charge of engineering for Culver. Since publication of the first picture of the plane in AVIATION NEWS, June 9, numerous inquiries have been received. The only one-placer now in preparation for mass production, the model M-18, is aimed at what Mooney considers a huge mass market. His company has already decided that unless the plane can be marketed for less than $1,500 it won't sell. A moderate quantity of M-18s for distributors, will precede any real production quantity, at the new Mooney location near the Cessna-Wichita plant, on a recently purchased 80-acre tract, where a group of metal hangar-type buildings will be erected.

MORE PLANES PER CAPITA—Kent, Ore., which has an adult population of 36, has six pilots and six airplanes in actual use or on order awaiting delivery, and has four flight facilities with additional ones planned by individuals. Kent may well have the highest planes per capita ratio of any community in the nation, since the national ratio is one plane to each 1,600 persons. Typical of the landing facilities is that of George Wilson, who houses his Taylorcraft in his farm implement shed, uses either the highway or a turf strip alongside for his takeoffs and landings.

STINSON MASS FLYAWAY—At conclusion of a recent Stinson dealers sales conference at the Wayne, Mich., Home Plant, dealers flew-away 72 Stinson Voyagers and Flying Station Wagons, in the largest mass delivery in the company's history, for deliveries in 35 states. More than 250 persons attended the dealer meeting at which William A. Blees, Consolidated-Vultee vice-president in charge of sales, and William H. Klenke, Jr., Stinson general sales manager, were principal speakers. The company has now 335 retail sales and service outlets in this country and overseas, and is continuing to sell all of its production as fast as the planes are manufactured, Klenke reported.

SEABEES IN WILDLIFE SERVICE—U. S. Fish and Wildlife Service of the Interior Department has taken delivery on three Republic Seabee amphibians, for use in Alaska Patrol Duty. D. C. Freimuth, veteran Alaska flyer of the Service, led the party of pilots who flew the planes away. They will be used for fish and game preservation, protective law enforcement, surveys, game and bird counts and predatory animal control. Each plane will carry two men and approximately 200 lb. of camping and emergency equipment with full fuel tanks, and will be able to cover 400 miles of fishing traps, for example, in a single day, taking the place of at least 20 power boats and their crews, Freimuth said.

Alexander McSurely

Transport Category Seen Facing General Revision

Landis expresses dissatisfaction with present slide-rule calculations governing take-off weight; urges consideration of human, other factors.

Pungent comments by CAB Chairman James M. Landis indicating he favors general revision of the highly controversial transport category of the Civil Air Regulations last week punctuated lively debate between airline pilots and aeronautical engineers on temporary changes proposed by the President's special air safety board. Landis is also chairman of the special board.

Revisions recommended by the board would result in greatly reduced payloads for four engine equipment using 4,000 ft. runways, particularly during the peak traffic loads of the summer season.

▶ **Public Hearings**—While airline pilots, engineers and the CAA have been battling over the transport category since 1938, public hearings on the special board's suggested changes offered the first opportunity to gauge Landis' position on the subject.

Landis indicated dissatisfaction with the slide-rule engineering calculations on which the transport category is based because they did not sufficiently emphasize the human factor under adverse conditions and other factors that occur in actual operations as contrasted with ideal test conditions. Landis also indicated he was not satisfied with certain conditions regarding administration and enforcement of the category provisions.

▶ **Human Factor**—Referring to the necessity of adding the human factor to engineering calculations, Landis cited the recent crash of a United Air Lines DC-4 off the end of Runway 18 at La Guardia Field.

"As I listened to the testimony, that plane should have gotten off. There was nothing wrong with the engines. Full take-off power was being applied, and really, I got up thinking the accident hadn't occurred. But it had and that is what worries me. As I listened to the scientific testimony that accident didn't happen—but it did. That is why I say there is a certain virtue in looking at normal behavior under such circumstances."

Landis also indicated he thought stop-and-accelerate distances were calculated too heavily on the basis of a fictional man whose reactions were assumed to be fixed.

▶ **Temperature Factor**—"One of the things that worries me basically in this formula (for computing accelerate-and-stop distances) is whether it really fits. I can see that from a scientific standpoint it is all right but does not fit what human beings do."

Landis indicated concern over testimony that every degree of temperature over 59 degrees Fahrenheit had the effect of adding 200 lb. to the take-off weight of a DC-4.

H. B. Cox, ALPA member of the special board, pointed out that under the present transport category where temperature is not considered as a factor above 59 degrees a DC-4 loaded with 50 passengers taking off in a temperature of 99 degrees has in effect added a passenger sitting in everybody's lap and eight more in the aisle.

▶ **Engineer Queried**—Cox asked Dr. W. B. Oswald, chief of aerodynamics at Douglas Aircraft's Santa Monica division, if he would be uneasy under such circumstances.

"If that is the way airplanes are operated corresponding to a 100 degree day I can't say that I would be upset about taking off. I could become upset at higher temperature but I feel that the present transport category has closely accounted for up to about 50 degrees."

Landis commented:

"The public would be considerably disturbed if on a 59 degree day the door opens and 59 more passengers were allowed in. But actually as a physical fact Cox points out that the same thing happens by lifting the temperature 40 degrees. We don't allow the airplane to be loaded that way at 59 degrees by adding a lot more passengers but at 99 degrees the airplane from a take-off standpoint is loaded exactly the same way as if you had an additional passenger in every seat and 8 in the aisle.

▶ **Unseen Passengers**—"I confess as I look at this temperature thing," Landis continued, "I see these unseen passengers climbing on these airplanes as the temperature goes up and it is not too comfortable a feeling."

Quizzing Charles Dycer, assistant chief of CAA safety regulation on take-off weight limitations, Landis asked:

"Aren't you disturbed by the problem of enforcement there?"

"No Sir," Dycer answered, "I think the

WEATHER INFORMATION BOARD:

Time-consuming passenger inquiries regarding weather have been reduced substantially at United Air Lines' airport terminals and downtown traffic offices through installation of 2½ x 3 ft. information boards showing conditions at 17 key points on carrier's system. At left is United's shield cutout which frames typewritten sheet containing current temperatures, cloud conditions, and data on whether rain, snow or fog prevails. Information appearing on report comes in by teletype at 6-hr. intervals from UAL's operations department.

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problem of enforcement there is relatively simple. The operating personnel of the company have the responsibility to stay within operating limits imposed by the transport category."

"Well, I confess I am a little disturbed," Landis said, "because in the case of the La Guardia accident I originally informed the Senate of the United States, on the basis of information submitted to me, that the plane took off within allowable weight limitations. I did it in good faith.

"Then next, during the hearing, testimony indicated that those weight limitations had not been calculated correctly and the plane took off in excess of the weight limitation. Now today I am told that the weight limitations that have been made so far for the DC-4 are all wrong because they ought to be calculated by another manual different from the one they are being calculated by now. It is sort of a merry-go-round to me from the standpoint of administration.

▶ **La Guardia Situation**—"I don't know what the weight limitations of the DC-4 are and can't find out. How can you enforce a thing like that?

"Actually this is the situation as it appeared at La Guardia. All the airlines had filed weight limitations for various runways at La Guardia. Where were they? Official filing of United were in Chicago, Eastern's were down in Atlanta. American's happened to be at La Guardia.

"Now nobody had ever checked those filings to see whether or not they were correct application of CAR 61. Nobody had checked that. And the absence of any master file on that would force the air carrier inspector's (CAA) office at Chicago to recalculate those things of his own accord. The air carrier inspector at La Guardia and Atlanta would have to do the same things which is a waste of time and money because those calculations might not come out the same way.

"The regulation would be a very simple one. Just have a master file on it so that you could go somewhere and find out what CAR 61 as applied to that runway gives you."

Landis also expressed interest in the wide variations in individual airline restrictions on particular runways. For example at La Guardia, United allowed a 60,900 lb. gross weight on Runway 18 while American Overseas limit was 55,000 lb. and Pan American permitted landing on that runway only with a 48 mph wind.

Airline pilots strongly supported the presidential board recommendations while engineers from airlines and Douglas and Lockheed opposed the changes. At a meeting attended by representatives of 12 airlines the Air Transport Association decided to oppose the changes.

The presidential air safety board was continuing its inquiry this week dealing with air traffic control problems.

Dawson Resigns

Wallace S. Dawson, director of CAB's Safety Bureau since last September, has resigned and will re-enter the Army Air Forces with his wartime rank of colonel. John M. Chamberlain, assistant director of the Safety Bureau, has been named acting director.

Although his resignation has been accepted, Dawson will remain with CAB in a semi-official status for an indefinite period—at least as long as his services are required as a consultant to the President's Special Board of Inquiry on Air Safety. In his new Army post, Dawson will be connected with the AAF's all-weather flying project and will be associated with Col. Joseph B. Duckworth, director of the Safety Bureau between December, 1945, and September, 1946. Both Dawson and Duckworth were formerly Eastern Air Lines captains.

CAB Investigates Florida Accident

Possibility that the chartered Burke Air Transport DC-3 which crashed near Melbourne, Fla., July 13, had run out of gasoline is being studied by CAB investigators.

Survivors of the accident, in which 21 persons were killed and 13 injured, have stated that the plane's engines stopped before it fell into the Florida swampland. Suggestions that the DC-3 was overloaded have been discounted despite the fact that it was carrying 31 passengers and a crew of five on its flight from Newark, N. J., to San Juan, P. R., via Miami.

▶ **Children Aboard**—The plane was licensed to carry 25 passengers and a crew of three, but operators of the craft stated that at least eight of the Puerto Rican passengers were children or infants in arms. A Miami-based firm, Burke Air Transport is owned by Andrew J. Burke.

CAB had no information on file concerning Burke Air Transport and stated that the company had not requested a route certificate or filed as an irregular air carrier under section 292.1 of the Board's economic regulations. CAA said the company was issued an air carrier operating certificate under part 42 of the Civil Air Regulations on Feb. 21, when it had three DC-3s.

▶ **Congress Interested**—Repercussions of the Florida crash—worst accident of 1947 involving an uncertificated operator—are being felt in Congress. Senator Owen Brewster (R., Me.) said Carl Dolan, technical advisory expert for the Senate Commerce Subcommittee on Aviation, will participate in the accident investigation. Dolan recently has been probing the Eastern Air Lines, United Air Lines and Capital Airlines (PCA) DC-4 crashes.

EAL Reports Need For More Mail Pay

A fast-slipping load factor and rising costs have pushed Eastern Air Lines, profit leader in the domestic air transport industry last year, into the ranks of carriers seeking increased mail pay from CAB.

Only domestic line to stay in the black during each month of the financially-disastrous first quarter of 1947, Eastern has informed the Board that the period of high load factors on its system is "definitely over" and has asked that its mail rate be raised from 45 cents a ton mile to a fair and reasonable figure. EAL said 60 cents a ton mile should be the minimum service (non-subsidy) rate in view of present costs and traffic levels.

▶ **Hits Competitors**—Thinly-veiled criticism of one or more of its competitors was contained in Eastern's statement—that other carriers in its territory are receiving much higher rates due to higher expenses "resulting from lax cost control." The petition asserted that failure of CAB to increase EAL's mail rate would represent a heavy penalty against a company that had kept costs under rigid control at a time when comparable carriers had not done so. Eastern did not name the "comparable carriers".

EAL reported record earnings of $4,504,643 after taxes last year, and net operating income for the first four months of 1947 was ahead of the like 1946 period. But the carrier's load factor has taken considerably more than a normal seasonal slump recently.

▶ **Load Factor Drops**—From around 75% in April, EAL's load factor dropped to 69.81% in May, 59% in June and 56.7% during the first six days of July—a total decline of over 18%. In contrast, the carrier reported an 88% load factor in April, 1946; 84.85% in May, 1946, 80.19% in June and 77.74% in July—a 10% drop.

EAL told CAB that its costs currently are about 40% higher than during the 12 months ended May 31, 1945, the year on which its present 45 cents a ton mile mail rate is based. The carrier said the 45-cent figure was predicated on equalization of the 4.5 cents a mile passenger fare and mail rates. With the passenger fare now 5 cents a mile, a comparable mail rate would be 50 cents a ton mile.

New Feeder Service

West Coast Airlines and Monarch Air Lines have announced plans for activating new segments of their feeder systems. WCA was slated to open its Portland-Medford, Ore., link via McMinnville, Albany/Corvallis, Eugene and North Bend/Marshfield late last week. Monarch expects to inaugurate service between Grand Junction and Denver, Colo., via Montrose/Delta, Gunnison and Canon City this week.

EAL, C&S and PCA Agreements Create Pattern for Pilots' Pay

ALPA makes substantial gains in three recent contracts; negotiations involving other carriers now underway; feeders also may have to agree to wage increases.

Development of a pattern for domestic pilot pay agreements is seen in a new Capital Airlines (PCA) contract which follows closely the recent pacts negotiated by Eastern Air Lines and Chicago & Southern Air Lines.

With these three agreements, in which both DC-4 and DC-3 captains and co-pilots won substantial wage boosts, the Air Line Pilots Association's habit of upsetting pilot pay precedents seems to have been broken for the time being.

▶ **Previous Action**—The TWA emergency board recommendation (July, 1946) was tossed overboard by ALPA in January, 1947, when TWA arbitrated after the strike of the previous October. In a March, 1947, agreement with American Airlines, ALPA threw out the TWA award as a precedent in the first basic overhauling of the Decision 83 pay formula since its origin in 1934. With the EAL agreement of last May, the American Airlines precedent was, in turn, almost completely disregarded. Now C&S and Capital have fallen into line with the Eastern pay formula and pay scales so that a pattern for the industry my, at last, have been established.

The EAL pattern takes the old Decision 83 flight hour pay scale for captains and carries the wage brackets to $5.80 and $8.70 an hour for speeds between 300 and 325 mph. This follows both the TWA emergency board recommendation and the TWA Chicago arbitration award on flight hour pay and is lower than the flight hour scale agreed to by American. As in the EAL and C&S agreements, the Capital pact gives captains of all types of aircraft base pay ranging from $2,200 for the first year to $3,600 at the beginning of the eighth year.

▶ **Same Scale**—This is the same base pay scale awarded in the TWA Chicago arbitration to captains of DC-4s and Constellations in domestic service and is the same as the base pay in the present American agreement. It is $50 a month higher than in the old Decision 83 formula which is still standard for airlines with whom ALPA has not completed current negotiations.

A number of additional carriers, including Braniff, National, Western, Mid-Continent, United, Pan American, Northeast, Pioneer, Colonial and American Overseas, are negotiating with ALPA. Since four airlines (AA, EAL, C&S and PCA) have increased the scale for DC-3 pilots at the same time they agreed to rates for larger aircraft, it can be expected that ALPA will be after almost all the certificated carriers down to the smallest for more pay. Whether this will extend to the recently-certificated feeders, now obligated to pay the Decision 83 scale, is a matter for speculation.

▶ **Formula Kept**—Mileage pay for Capital (as with EAL and C&S) keeps the miles-in-excess-of-100 mph. formula which has frustrated many computers of airline pilots' pay. Captains get 2 cents a mile for the first 2,000 per month over the 100 mph. limit and 1½ cents for additional "excess miles" not to exceed 10,000.

The major departure from precedent in the Capital, C&S and EAL agreements is the weight differential of 1¾ cents per flight hour for each 1,000 lb. of maximum certificated gross weight for a given type of plane. This amounts to $1.26 per flight hour for both EAL and C&S DC-4 captains but only about $1.10 for PCA captains, since the latter's DC-4s are listed at 63,000 lb. compared with 73,000 lb. for the other two airlines.

▶ **Differential Established**—American was the first to initiate a weight differential in pilots' pay but did it by establishing three flight hour pay scales, each progressively higher, for aircraft with gross weight under 50,000 lb., 50,000 to 100,000 lb., and 100,000 to 150,000 lb.

Under PCA's formula, an eight-year DC-4 captain, flying 80 hours a month, half day and half night, will receive annually $3,600 base pay, $6,000 flight-hour pay, $1,632 mileage pay and $1,058.40 weight differential pay, for a total of $12,290.40. This example assumes a speed bracket for the DC-4 of 200-225 mph. and an average speed of 205 mph. On the same basis, an EAL captain would receive $151.20 more because of the greater gross weight of an Eastern DC-4.

▶ **Boost for Co-pilots**—Co-pilots for PCA, C&S and EAL on aircraft of all types will receive $280 monthly for the first six months to $440 monthly at the beginning of their fifth year of service. This is $60 a month over the old scale before four-engine aircraft were widely used, $30 a month higher than the co-pilot scale agreed to by ALPA and American, and $20 a month higher than the TWA Chicago award for DC-4s in domestic service.

Present captain pay scales on PCA, C&S and EAL contrast with earlier ALPA demands for DC-4 pay in domestic operations which were substantially higher. ALPA wanted $15,500 annually from American (proposal of Oct. 5, 1945) and $16,500 from TWA (proposal of Dec. 3, 1945). These figures are based on 80 hours per month, half day and half night, although ALPA made the maximum demand less by proposing a 75-hour monthly flight limitation.

▶ **Pilots Gain Objectives**—ALPA's last demand on TWA for captains of DC-4s (eighth year) in domestic service, before the strike of October and November last year, amounted to $1,074 monthly for 80 hours, half day and half night. This compares with $876 monthly recommended by the TWA emergency board and $936 monthly awarded as a result of the TWA Chicago arbitration.

With American now paying $1,050 monthly to eight-year DC-4 captains and EAL, C&S and PCA paying only a few dollars less, ALPA has come close to winning the pay scale asked of TWA before the strike. In addition, ALPA has won substantial increases for DC-3 co-pilots and captains.

New Labor Law

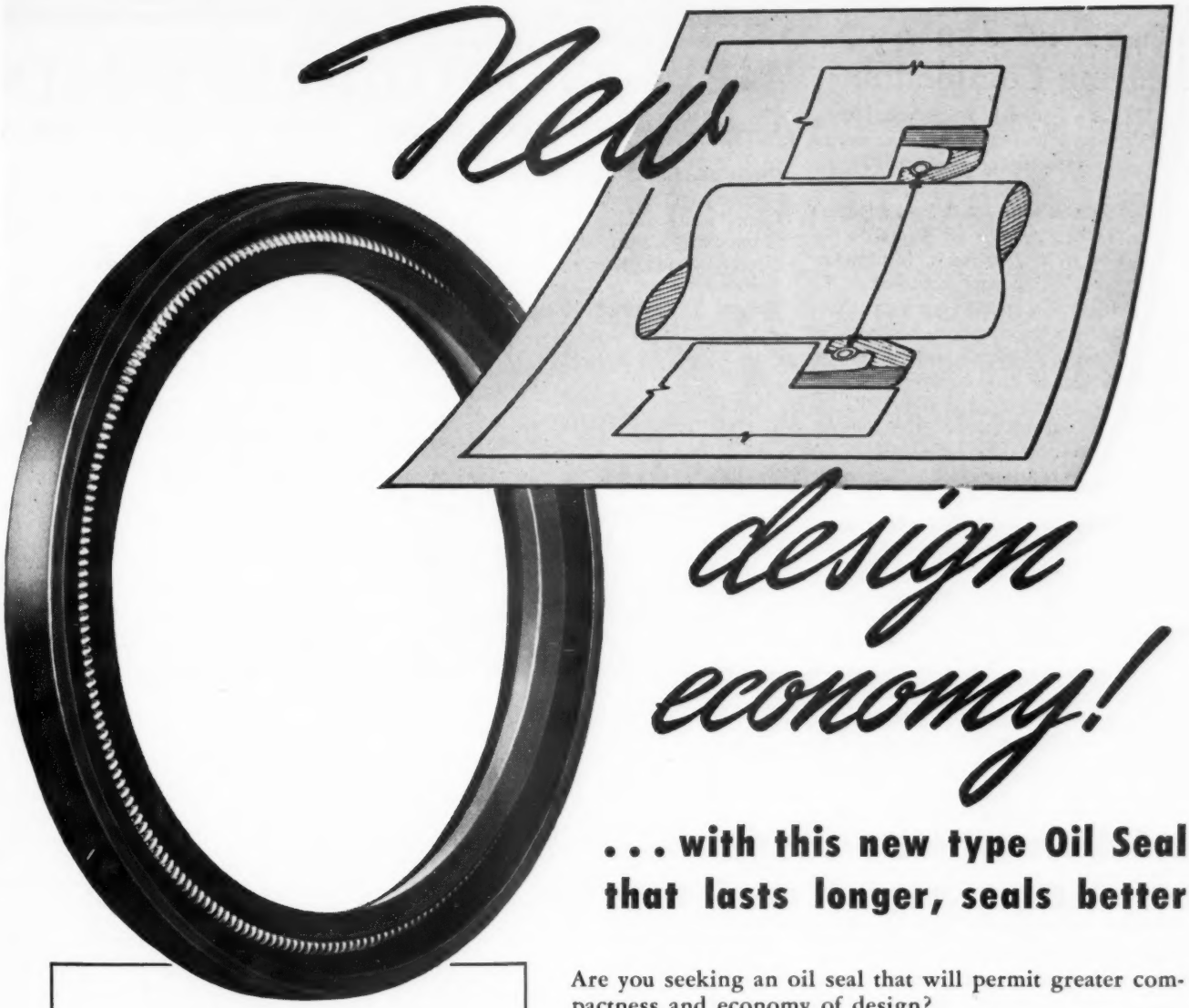
While persons covered by the Railway Labor Act are exempt from most provisions of the new Taft-Hartley Act, the exact degree to which the latter affects airline employes and employers is still somewhat obscure. This is not the case, however, of the ban on expenditures or contributions for political campaigning. The political expenditures section of the new law is in the form of an amendment to the Corrupt Practices Act, and there is no language in the amendment which would exempt airline and railroad unions.

Airline unions may be affected by the Taft-Hartley Act in other ways, since many of them, like the International Association of Machinists and the UAW, have tens of thousands of members outside the railroads and airlines who are clearly covered by the new legislation. That means these unions, in order to keep their rights under the Taft-Hartley Act, must file reports on their finances and methods of conducting their activities, and their officials must file affidavits that they are not communists and do not advocate overthrow of the Government by force.

Tigers Flying Atlantic

Flying Tiger Line has completed its first two C-54 charter trips to Europe and plans to make additional trans-Atlantic flights this summer. Company will acquire more C-54s both for world-wide contract operations and to replace its C-47s on transcontinental cargo runs. Two C-54s are now on hand.

New design economy!



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Clipper Seals were developed by Johns-Manville to protect vital bearings in our fighting planes during World War II. Their superior advantages as an oil seal were thoroughly tested and proved. Now they are available to the entire industry to provide the same efficient, long-term bearing protection.

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This new type Johns-Manville oil seal is available with a light flange section that permits designing oil seal cavities with depths as little as ¼". In fact, because of its unique 1-piece design, there is no cavity mechanically practicable which is too shallow—or too deep—for a Clipper Seal.

Consisting of a rigid heel and a tough but flexible lip moulded into a single unit, Clipper Seals provide an exceptionally long wearing oil seal with superior lubricant-retaining, dirt-excluding qualities. They are easily installed and may be removed without damage. Non-metallic, they are also resistant to most forms of corrosion.

Clipper Seals are made to fit any size shaft from ⅝" diameter up. For further information, write Johns-Manville, Box 290, New York 16, N. Y.

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CAA Pilot Study Nearing Completion

The CAA-sponsored psychological study on selection, training and upgrading of airline pilots—now being conducted by the University of Pittsburgh's American Institute for Research—is slated for completion by the end of August.

Working with CAA funds, Institute researchers have conducted interviews in 20 cities with airline pilots, company check pilots and CAA air carrier inspectors to obtain examples of pilot behavior in critical situations, pilot ideas on improving methods of checking proficiency, and information on the causes and effects of pilot fatigue. Other sources of data have been CAA records of examinations for airline pilot ratings, company records on successful and unsuccessful pilots, and CAB accident reports. Names of individuals are not being used.

Results of the project are expected to include a statement of the most important attributes required of a pilot; improvements in the examination for airline transport pilot rating, and a report that will make available the benefit of the experience of hundreds of airline pilots in critical situations.

Radioactive Elements Flown From Oak Ridge

The 1,000th shipment of short-lived radioactive isotopes dispatched from the uranium chain-reacting pile at Clinton Laboratories, Oak Ridge, Tenn., was carried from Knoxville, Tenn., to Washington, D. C., by American Airlines this month.

Because the potency of the radioisotopes (used in medical and biological research throughout the country) is of exceptionally brief duration, 498 of the 1,000 consignments from Oak Ridge have been made by plane and the remainder by rail express. Shipments began in August, 1946, but were not publicized until this month.

In the case of the radiophosphorus contained in the 1,000th shipment, potency is halved in 14 days. Other radioisotopes with exceptionally short "half-lives" which have been dispatched by plane include radiogold, radiopotassium, radiosodium, radioiodine, radioarsenic and radiobromine, whose potencies are halved in 2½ days, 12.4 hours, 14.8 hours, 8 days, 26.8 hours and 34 hours, respectively.

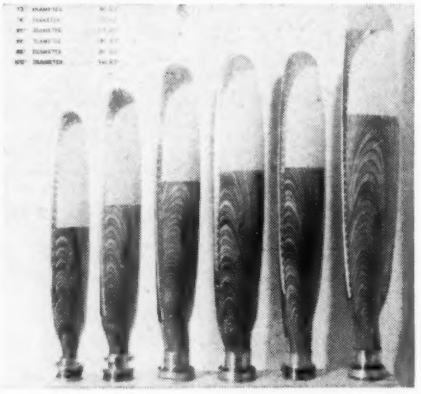
PAA Mail Pay Set

Pan American Airways will receive $2,572,000 for carrying mail between the U. S. and Alaska and on routes within Alaska for the period Aug. 1, 1944, to Dec. 31, 1945. the payment set by CAB is the equivalent of 90.36 cents a plane mile and will give PAA an operating profit of $342,705—a 7 percent return on the carrier's investment in the Alaska sector.

NEW AVIATION PRODUCTS

Birch Bondwood Fixed-Pitch Props

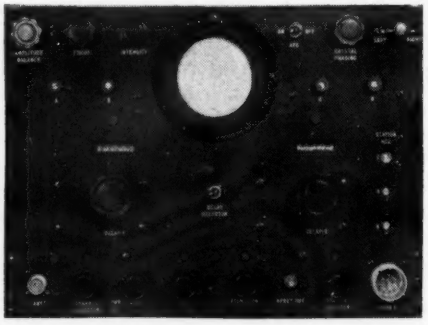
Production is now underway on Strato-Prop, new fixed-pitch airscrew manufactured by **Flottorp Mfg. Co.**, Kent County Airport, Grand Rapids, Mich. Initially marketed for use on Cessna 120 and 140, Stinson Voyager and Stationwagon, and



Luscombe 65 and 85, propeller will also soon be available for Piper, Ercoupe, and other craft. Made of Birch Bondwood in $\frac{1}{16}$-in. laminations providing 57 moisture proof glue lines, Strato-Prop is stated to feature increased strength and longer life. Maker reports it has hard, almost damage-proof surface which is especially resistant to mars, cuts, and stone bruises. Fitted is company's standard stainless steel leading edge.

New Volume-Controlled Radio

New development in radio receiving equipment for pilots and flight control operators is volume-controlled Monoset, made by **Telex, Inc.**, Minneapolis. Set is stated to make beam flying easier, volume



control permitting tuning down of annoying static. Set is similar in design to a doctor's stethoscope, having new type of headset worn under chin rather than over head. Unit is extremely light weight, being made of Tenite.

Coats Aluminum Against Corrosion

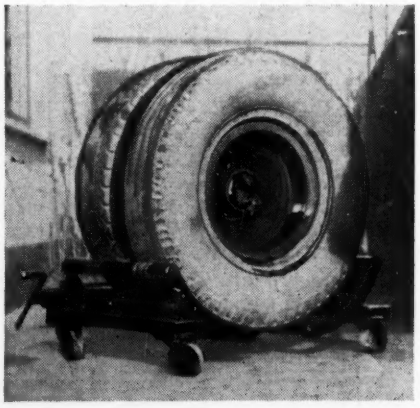
New simple and rapid method for coating aluminum against corrosion is announced by **American Chemical Paint Co.**, Ambler, Pa., which has developed special product, Alodine, for use on both painted and unpainted aluminum surfaces. Maker states this non-electric chemical process produces superior type coating hitherto associated only with anodic treatments. Material may be applied by either spray or immersion methods to aircraft or aircraft parts, and it both coats and seals simultaneously. In this Alodizing process, a thin, tough skin positively integrated with the metal is formed by interaction of the aluminum and chemicals, resulting in surface which is resistant to shocks, bending, and denting.

For Aircraft Radio Field Checks

Termed ideal for checking aircraft radios in the field is new Model 214 self-contained battery-operated electronic volt-ohmmeter which eliminates need of plugging into an a.c. line. Maker, **Hickok Electrical Instrument Co.**, 10619 Dupont Ave., Cleveland 8, states that for resistance and voltage tests, sets need not be removed from aircraft.

Wheel Pulling Simplified

Tire lift with dual wheel accommodation is seen of special interest to aircraft maintenance shops, since device is stated to take all "fight" out of job of wheel pulling. One



man can operate lift by first jacking wheel clear of ground, then closing lift about time, and removing. Device will handle single or double tires from 6.50 to 14.00. Maker is **Lewis Tire Equipment & Supply Co.**, 2740 Zuni, Denver 11, Colo.

Electrode for Gear Welding

Improvements are reported in new all-position electrode developed primarily for use in welding such aircraft assemblies as landing gear, engine mounts, and other parts requiring great strength. Designated No. 524, electrode is now available in $\frac{5}{64}$, $\frac{3}{32}$, $\frac{1}{8}$, and $\frac{5}{32}$-in. dia. sizes. Maker, **Wilson Welder & Metals Co.**, 60 E. 42nd St., New York City 17, states that with this electrode the necessity for preheating is minimized when welding high strength chrome-moly aircraft steels, also that weld deposits made with the 524 are not susceptible to cracking even when preheating is not employed, since weld metal is more ductile. Tensile strength obtainable is put at approximately 150,000 psi. when deposited metal is heated to 1,600 deg. F., quenched in oil, and drawn at 600 deg. F. for 1 hr.

Stinson Gives Dealers

"A Solid Foundation For A Profitable Business"

Leslie H. Bowman, Fort Worth, Texas, who backs his Stinson operation with 30 years' experience in aviation.

Meet Leslie Bowman, whose current sales volume is running 200% above his record for '46!

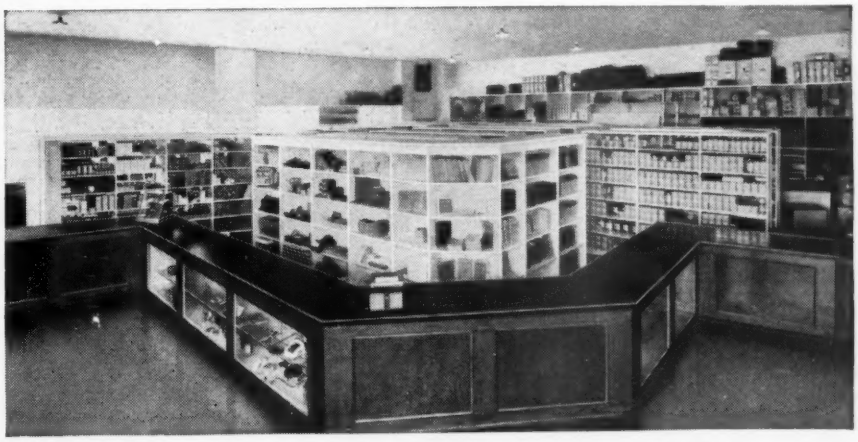
Famed as one of the pioneers of personal aviation, Leslie Bowman looked the field over before he signed with Stinson.

Today he writes: "Thanks to the experienced management, the proved engineering, and the alert sales policies of Stinson, we have a solid foundation for a profitable business. We have real *utility* planes to sell—4-place 'fly-anywhere' planes of quality that attract and hold the kind of owners every airplane dealer wants."

Bowman's widely-known Aircraft Sales Company, Fort Worth, Texas, now represents an investment of $335,000. It employs 60 people. It is currently doubling—and might even *triple* —its high sales volume of '46.

That's long-range *career* business. Profitable business with a real future to it!

Stinson has some additional opportunities waiting for operators who can qualify—and who want action! For complete details, write or wire William H. Klenke, Jr., General Sales Manager, Stinson Division, Consolidated Vultee Aircraft Corporation, Department G, Wayne, Michigan.



Complete facilities of the Aircraft Sales Company include a retail store, fully stocked with parts, accessories, and general flying equipment.

$335,000 investment—and still growing! At Fort Worth's famous Meacham Field, Aircraft Sales Company maintains complete aircraft, engine, radio, and propeller shops. In the foreground are four Stinsons—America's most useful personal planes—easy to fly, easy to buy . . . *easy to sell!*

Stinson

For 21 years, builder of America's most useful personal planes

SHORTLINES

▶ **Alaska Airlines**—Has taken over an American Airlines commitment for hauling construction equipment and supplies northward from Seattle. Company has purchased two DC-4s used by American on its freight run to Alaska and has leased a third DC-4 from Capital Airlines (PCA). Carrier now has five DC-4s and seven DC-3s in service.

▶ **Delta**—Was in the black for the third successive month in May, showing net operating income for the month of $27,239 and net profit of $10,902 after taxes.

▶ **National**—Last week was slated to place its second DC-6 in service on the New York-Miami route.

▶ **Northwest**—Has declared a quarterly dividend at 28¾ cents a share on 390,000 shares of 4.6 percent cumulative preference stock outstanding. Dividend is payable Aug. 1 to stockholders of record July 18.

▶ **Pioneer**—Set a new monthly traffic record in June by flying 5,627 passengers 1,504,969 revenue passenger miles.

▶ **Qantas Airways**—Plans to be operating twice-weekly Constellation service between Australia and Great Britain before the end of the year. The Qantas flights will be an all-Australian operation, as distinguished from the thrice-weekly service which the line now conducts jointly with BOAC.

▶ **Southwest**—Carried 1,586 revenue passengers over the fourth of July weekend—approximately the same number as it flew during all of January. Company carried 8,236 revenue passengers during June for a 42.32 percent load factor.

▶ **Trans-Australia Airlines**—Expects to receive five Convair 240s and four Constellations before year-end. . . . Competition from government-owned TAA is beginning to pinch privately-operated services such as Australian National Airways. Government-owned services ultimately will carry all airmail in Australia.

▶ **Trans-Canada**—Hopes to have a service between Montreal and Latin America operating by early fall. TCA will make the run via Bermuda, Bahamas, Jamaica and Trinidad. . . . Now conducting 11 flights weekly between Montreal and London, the carrier expects to increase its frequency to 20 trips weekly when sufficient equipment and crews are available. Six DC-4M aircraft are being used on the trans-Atlantic run, and 20 more are on order with Canadiar, Ltd., for use on various international links.

▶ **TWA**—Has increased its trans-Atlantic schedules from 18 to 22 weekly, including one all-cargo flight.

▶ **United**—Has joined with Pan American Airways in providing a round-the-world service from any of 42 cities on its system for $1,700. United planes will connect with PAA for an eastbound departure from New York every Friday and a westbound departure from California each Thursday.

Brack to Direct Sales at Braniff

Braniff Airways has appointed Reginald Brack to the newly-created position of General Sales Manager with headquarters at Dallas.

In addition to promoting passenger, mail, express and freight traffic, Brack will supervise sales activity among travel agencies and on an interline basis with connecting carriers. He joined Braniff in May, 1944, as district traffic manager in Kansas City and in 1946 was named manager of Braniff's northern traffic region.

Other personnel developments:

• **Air France**—James B. Lambert has been appointed superintendent of properties and facilities for the North American region.

• **Continental**—Frederick L. Ehrman, partner of Lehman Brothers banking firm, New York, has been elected to the board of directors.

• **Delta**—John H. Williamson has been appointed assistant chief pilot.

• **Mid-Continent**—Jack Francis has been named supervisor of rates and tariffs and James G. Swarts, Jr., assistant to the director of public relations. Swarts was formerly with TWA.

• **Pacific Overseas**—Edward W. Piersol, director of public relations, died this month.

• **Pan American**—Richard C. Lounsbury, assistant general traffic manager since last September, has been named general traffic manager. Robert K. Kinzel, formerly in charge of PAA's cargo sales, has become president of A. Johnson Co., Inc., New York export-import firm.

• **Slick**—Samuel C. Dunlap, III, co-founder and executive vice president of the air-freight line, resigned effective July 15. He will establish his own aeronautical consulting business in San Antonio.

• **TWA**—Frederick G. Betts and J. A. Thomas have been appointed assistants to President Lamotte T. Cohu.

CAB SCHEDULE

July 24. Hearing on Linea Aeropostal Venezolana's foreign air carrier permit amendment case. Postponed from July 17. (Docket 2987.)

Aug. 4. Hearing on Pan American Airways application for service to Melbourne, Australia. (Docket 2881.)

Aug. 4. Oral argument in Boston-New York-Atlanta-New Orleans route case. (Docket 730 et al.)

Aug. 18. Hearing in Chicago Helicopter service case. Extended from July 28. (Docket 2384 et al.)

Aug. 25. Hearing in case involving additional service in California-Nevada area. Postponed from July 17. (Docket 2019 et al.)

Sept. 2. Hearing in Latin American Certificate Amendment cases of Panagra and Braniff. (Dockets 2527 and 2622.)

Sept. 8. Hearing on Mid-Continent's proposed service between Minot, N. D., and Regina, Saskatchewan. (Docket 628.)

Sept. 29. Hearing on Mid-Continent's application for alternate Kansas City-New Orleans Route. (Docket 1956.)

Oct. 7. Hearing involving additional Florida Area Service. Postponed from Aug. 12. (Docket 1668 et al.)

Nov. 15. Hearing on Board's Investigation of Consolidated Airfreight Tariff Agreement. (Docket 2719).

NEW AIRPORT CONSTRUCTION

PROPOSED WORK

Neodesha, Kan.—AIRPORT—City, A. T. Weywood, mayor, voted $45,000 bonds, airport. $116,000. C. C. Pate Eng. Co., Richard Bldg., Tulsa, Okla., consult. engr.

Salina, Kan.—AIRPORT—City, C. E. Banker, clk., voted $203,250 bonds, airport. $400,000.

Elma-McCleary, Wash.—AIRPORT—Cities of Elma and McCleary, airport. $180,000. CAA. Bids in 1948-1949. C. J. Phillips, Shelton, engr.

Enumclaw, Wash.—AIRPORT—City, imprv. airport. $170,000. CAA. H. H. Sisler, City Hall, Kirkland, engr.

Glacier, Wash.—AIRPORT—State Aero Comn., 905 Second Ave., Seattle, Zone 4, airport on Mt. Baker. $220,000. CAA. Bids in 1948-1949. R. L. Nuber, proj. engr.

Goldendale, Wash.—AIRPORT—City, imprv. airport. $200,000. CAA. A. G. Hanson, city engr.

Kelso-Longview, Wash.—AIRPORT — Kelso-Longview Airport Comm., Kelso, airport imprvs. $102,000. CAA. Bids next year.

Leavenworth, Wash.—AIRPORT—State Aero Comn., 905 Second Ave., Seattle, airport. $140,000. CAA. R. L. Nuber, proj. engr.

Randle, Wash. — LANDING FIELD — State Aero Comn., 905 Second Ave., Seattle, Zone 4, emergency landing field on Mt. Ranier. $350,000. CAA. R. L. Nuber, proj. engr. Bids in 1948-1949.

LOW BIDDERS

San Francisco, Cal.—AIRPORT—Pub. Utilities Comn., City Hall, paving, draining, and related work at San Francisco Airport, Spec. 96, from C. L. Harney, 575 Berry St. $987,109.

Dallas, Tex.—APRON PAVING—Yards & Docks Annex, Navy Dpt., Arlington, Va., concrete paving apron and taxiway, Hensley Field, from Mid-South Corp., 624 Gravier St., New Orleans, La. $130,831.

Keesler Field, Miss. (P. O. Biloxi)—RADAR SCHOOL—U. S. Eng., P. O. Box 1169, Mobile, Ala., converting facilities into radar training school, Serial No. 01-076-47-195, from H. J. Koski, Selma, Ala. $184,000.

Minden, Nev.—AIRPORT IMPRVS.—Sacramento Dist. Corps of Engrs., Wright Bldg., repairing runways, taxiways, night lighting sys., Minden Airfield, Spec. 1290, from Isbell Constr. Co., P. O. Box 2351, Reno. $84,445.

Fort Worth, Tex.—AIRFIELD WAREHOUSE—U. S. Eng., c/o Post Quartermaster, 8th AAF, Forth Worth Army Airfield, warehouse and repairs, from Cunningham & Shaw, Flatiron Bldg. Approx. $40,000.

CONTRACTS AWARDED

Lakehurst, N. J.—HANGARS—Yards & Docks Annex, Navy Dpt., Arlington, Va., strengthening lighter-than-air hangars NOY 14280, to Timber Structures, Inc., 535 Fifth Ave., New York City. $145,420.

St. Paul, Minn.—HANGAR—State Military Dpt., masonry, steel addn. to armory hangar at Holman Field, to Hagstrom Constr. Co., 1567 Selby Ave. $149,778.

Rapid City, S. D.—AIRPORT HOUSING—U. S. Eng., 1709 Jackson St., Omaha, Neb., converting barracks into apartments at airport, to Brezina Constr. Co., Rapid City. $81,599.

Bermuda—AIRPORT IMPROVEMENT—U. S. Eng., 120 Wall St., New York City, Zone 5, construction in Stocks Harbor and Ferry Reach near Kinsley Field, dredging channel 4,100 ft. long 80 ft. wide, movable bridge across channel in causeway, connecting airfield with mainland, etc., to Arundel Corp., foot of Fulton St., Brooklyn, N. Y. $1,480,839.

Muroc, Cal. — AIRBASE HOUSING — U. S. Eng., 751 S. Figueroa St., Los Angeles, 100 prefab temporary family quarters, to W. Radkovich Co., 4920 E. Wash. Blvd., Los Angeles. $750,000.

Miami, Fla.—AIRPORT BLDG.—Eastern Air Lines, 36th St. Airport, temporary terminal, to Duffy Constr. Co., 1452 N. Miami Ave. Est. over $40,000.

Toledo, Ohio—AIRPORT IMPRVS.—J. H. Dewhurst, dir., taxiways, parking aprons, water and sewerage sys., etc., to Clyde P. Launder (Launder & Son), Glendale & Terminal R.R., $324,584 . . . . 80x200-ft. admin. bldg., 16 ft. high with 20x200-ft. lean-to, to Robt. E. Nesmith, Houston, $64,850 . . . moving east hangar, razing sub-station and grange bldg., to L. W. LaPlante, 2325 E. 46th St., Indianapolis, Ind., $69,988. Grand total $459,422.

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UNUSUAL OPPORTUNITIES

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of

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SELLING OPPORTUNITY OFFERED

SALES AGENCY—An opportunity to build a business of your own under the direction of a national aviation sales organization. Unusually high earnings possible (Upwards of $1000 per month). You must have sales ability, be willing to work hard and sincerely believe in the future of aviation. Sale of planes or equipment not involved. Five to ten thousand dollars required depending on the territory. A knowledge of aviation is helpful but you must not now be a flight operator. Only one appointment open from each non-competitive market area. Give full particulars of your background and how you can be reached by telephone to arrange a preliminary interview. RW-1113, Aviation News, 68 Post Street, San Francisco 4, Cal.

POSITIONS WANTED

AIRLINE TRANSPORT Pilot 14 years' experience, 7,400 hours total; 5,000 hours as Captain on two- and four-engine aircraft. No accidents. Can furnish best of references. Desire position as company pilot or Feederline pilot. 35 years old. PW-1151, Aviation Week, 630 N. Michigan Ave., Chicago 11, Ill.

EXECUTIVE PILOT—15 years executive experience in merchandising, advertising, management and personnel with syndicate chain stores. Over 4000 hours civilian and army equipment. Commercial, instructor, instrument, single and multi-engine. A. T. C. experience in Canada, Alaska, India and the U.S.A. Age-35, single. Available thirty to sixty days. W. C. Pace, 500 Franklin, Boise, Idaho.

AIRLINE TRANSPORT Pilot, 6300 hours 0-6600 hp rating, 12 years experience in aviation flying all types of twin and 4 engine equipment on domestic and international airlines and executive pilot. Can furnish best of references. Married, reliable. Desires position with company as executive pilot. PW 1135, Aviation Week, 330 W. 42nd St., New York 18, N. Y.

AIRLINE CAPTAIN, 33, excellent health, 7100 hours, four years naval flying, seven-half years pilot world's largest international airline, Harvard A. B., must leave overseas flying due family's health. Desires position as executive or feeder line pilot. E. C. Hodson, 144-80 Sanford Ave., Flushing, N. Y.

BOOKS

New text "Principles of High Speed Flight" $2.50. Transonic and supersonic aerodynamics, turboprops, turbojets, ramjets, rockets. Table of contents, free on request. Southeastern Research Inst., Inc., Box 1331, Atlanta, Ga.

FOR SALE

New BG-4B2S Spark Plugs
75c each. Discount to dealers. Send for latest catalog. Karl Ort, Dept. SP-13, York, Penna.

Noorduyn Norseman:
875 hours total airframe. 160 hours total new engine. Licensed night, instrument, 9 place or 2500 cargo. Excellent condition. Clipper Air Specialties, Lambert Field, St. Louis, Mo.

Lockheed P-38 M-5-Lo Piggyback NX 62805 total time 65 hours since new. Complete set instruments and radio equipment. Considerable conversion work accomplished. Photograph available on request. Located on LaGuardia Feld, New York. $3500.00. Also Howard Aircraft NC 9843H D.G.A. 15 total time 310 hours. Newly painted and licensed. Complete instruments and radio equipment including loop antenna. Ready to go at $4900.00. Robert M. Barkey, Parsons Industries, Inc., Travense City, Michigan.

FAIRCHILD PT-26A low time, well equipped including two-way radio, full panels, starter, etc. Exceptionally clean—$1800.00. Bruce Burk, 2020 S. Genesee, Los Angeles, California.

WANTED

Wanted Small Radial Airplane Engine
With three blade propeller, anywhere from three to twenty horse power. The Boomerang Air Craft Co., Alba, Texas.

COMPLETE AIRLINE FOR SALE

Sale price includes the following. Franchise for 853 miles of intrastate route, three Cessna UC 78's in excellent condition one BT-13-A above average, Spare parts include four spare engines, one unlicensed UC78, new metal prop governors, fuel pumps, tires etc. Office space, field rights, gasoline and oil contracts and office equipment. An excellent opportunity for three or four young pilots that want to own their airline.

Full price $27,500.00

BO-1307, Aviation Week
68 Post St., San Francisco 4, Calif.

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Parts For R-2000-7's and R-1830-92's. All parts and Engines Packaged for Long Time Storage and Export.

MEMO: We are handling increasing quantities and types of engines and engine parts. Rapid inventory changes prevent keeping up with our stock in these ads. For your greatest advantage we strongly recommend that you

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CABLE: STEDAV. Phone: PLymouth 5-5144 or MEnlo 4-4579

Flyin' high-and lasting longer because they're Ampco extruded bronze

In Wright Cyclone Aircraft Engines, Ampco Extruded Bronze is specified for its efficiency at extreme temperatures, its corrosion resistance, and its strength-weight ratio.

Wear-resistant aircraft parts cost less when machined from Ampco extruded stock

Exceptionally high strength-to-weight ratio is an indispensable asset for aircraft parts. This quality is one of seven outstanding performance advantages of Ampco aluminum bronzes — advantages which give *better* and *longer* service for vital parts subject to wear in any application.

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Two grades of Ampco Metal and two grades of Ampcoloy (industrial bronzes) are regularly produced in extruded form by Ampco. Rods in a complete range of sizes are available for immediate shipment. Write for Bulletin 64A for complete details.

AMPCO Metal
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The Metal without an Equal

Ampco Metal, Inc.
Department A-7, Milwaukee 4, Wis.
Field Offices in Principal Cities

AA-13

Ampco Metal gives these 7 outstanding performance advantages
Resistance to — Corrosion • Compression • Impact • Fatigue • Wear — Excellent bearing qualities • Efficiency in extreme temperatures.

SEARCHLIGHT SECTION

(Continued from page 63)

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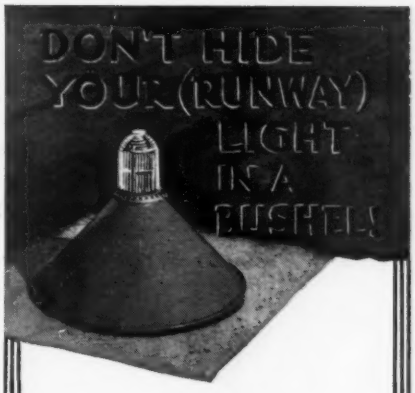

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By L. R. Parkinson

A brief, simply written explanation of all basic principles, including much useful data on airfoils, stability, flight tests and wind tunnels. A handy guide for all those in design, engineering and testing departments. Illus. $2.25

Send for on-approval copies

MACMILLAN • 60 Fifth Ave., N. Y. 11

COMING IN SEPTEMBER AIR TRANSPORT

ANNUAL ENGINEERING and MAINTENANCE ISSUE

In this issue—Air Transport will announce its annual Maintenance Awards to U. S. airlines for outstanding maintenance performance in 1947.

This important Maintenance issue will be read with unusual interest by the chief engineers, maintenance engineers, maintenance superintendents and other maintenance management men of the scheduled and non-scheduled U. S. and U. S.-International airlines.

Maintenance heads of Northwest, Eastern, American Overseas, United and others will conduct a round table conference in PRINT in this issue.

Reserve space early—closing date August 10th.

AIR TRANSPORT

McGraw-Hill Publishing Co.

330 West 42nd Street

New York 18, New York

PETTY LITTLE MEN

Another powerful group has rebuked the Civil Aeronautics Administration, this time the Hinshaw Committee of the House of Representatives.

How long, oh, how long must aviation be hamstrung by a handful of CAA Civil Service seat warmers whose petty jealousies and politics overpower any spirit of public service?

Their industry is in defending the mistakes which out, in denying those not yet proved. Their ambitions are to retain their powers as best they may, regardless of the public good.

Their pride is in showing the world they are impervious to outside experience and knowledge; and that they will have their own short-sighted ways by whatever means they can devise.

Their technical inferiority is equalled only by the woeful lack of any spirit or understanding of progress.

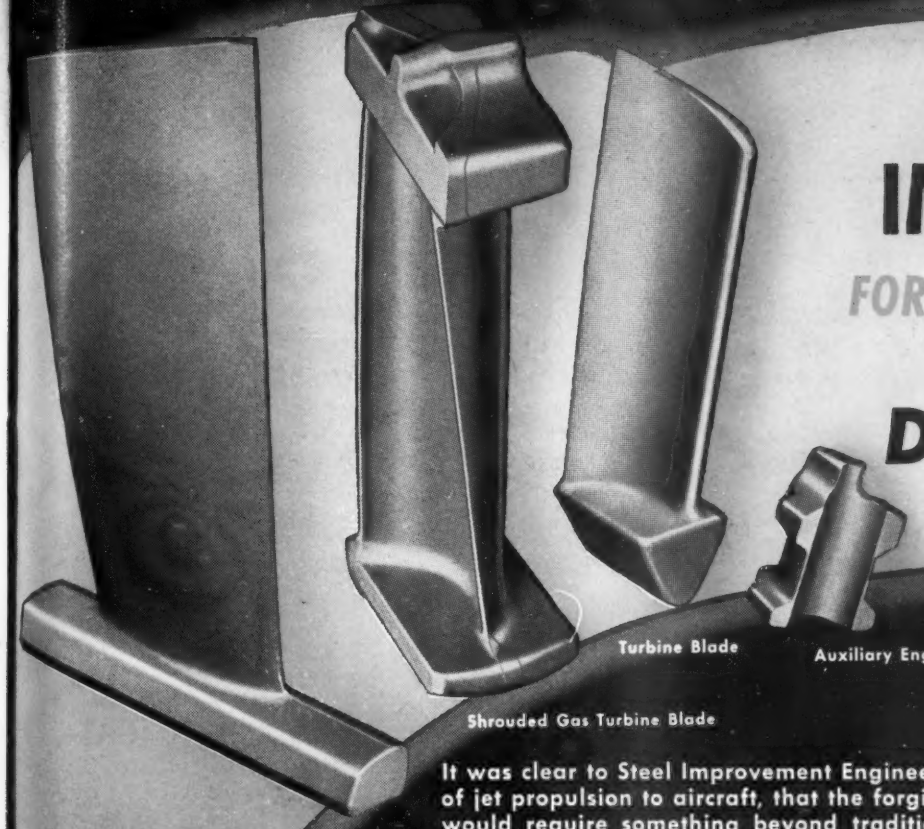
Although their number is probably not over 15 or 20, they are holding down to their own level scores of other capable and well-intentioned men in CAA. CAA in turn is retarding every phase of commercial aviation.

How long, oh, how long, will these little men continue to have their own way?

ROBERT H. WOOD

STEEL IMPROVEMENT

FORGED TURBINE BLADES ARE ALWAYS Dependable



Turbine Blade

Auxiliary Engine Turbine Blade

Shrouded Gas Turbine Blade

Axial Flow Compressor Blade

It was clear to Steel Improvement Engineers, at the initial stage in the application of jet propulsion to aircraft, that the forging of turbine blades, buckets and wheels would require something beyond traditional forging techniques. There followed the immediate adoption of an attitude in which the urge to pioneer, to persist in the effort to discover and establish correct techniques for forging high temperature alloys to close tolerances, was given the utmost freedom of action. Responding to the irrepressible urge to forge correctly these essential parts, funds were generously appropriated at the beginning to obtain or develop suitable equipment and to conduct experimental forging. Success crowned this effort. Thousands of these vital parts have been formed of the new high temperature alloys by drop forging to close tolerances. On the basis of long experience in forging intricate designs, and of the specialized metallurgical and engineering skill acquired, it is now possible for Steel Improvement Forging Engineers and Metallurgists to: (1) know the exact forging technique that should be utilized for developing fully the qualities, inherent in the alloy, that are required to meet the high stresses occurring in modern aircraft engines; (2) avoid costly experimentation in forging, heat treating and machining blades, buckets and wheels; (3) advise and assist designers regarding the correct placement of parting lines and other design elements; and (4) adhere strictly to a policy of projecting a promise only when the accomplishment of the work can be substantiated by fact or experience or both.

THE VITAL ELEMENT IN THE IMPROVEMENT OF METALS BY FORGING IS MEN!

Backed by over 33 years of forging production experience, Steel Improvement Engineers and Metallurgists have under their direction complete facilities for performing the highly specialized work of forging, heat treating and machining turbine blades, buckets and wheels of high temperature alloys. These facilities constitute a Turbine Forgings Division, the authority and responsibility of which encompasses all required phases of engineering, metallurgy, production and inspection to assure you dependable forgings.

Turbine Forgings Division

DROP FORGINGS

THE STEEL IMPROVEMENT & FORGE CO.

942 East 64th Street CLEVELAND, OHIO

Sales Offices: New York • Chicago • Milwaukee • Tulsa • Los Angeles

LONG but LIGHT!

You're looking down the length of the upper cargo section of the Boeing Strato-freighter, the new YC-97 Army Cargo plane—one of the newest aircraft to be equipped with G-E fluorescent lamp ballasts. Ever since General Electric started supplying this equipment for aircraft, our specially designed ballasts have been used on all types of planes. These ballasts are designed for altitudes up to 50,000 feet, temperatures from minus 70 C to 71 C and are capable of withstanding severe shock and vibration.

Like all other General Electric aircraft equipment, these ballasts are lightweight, and have been carefully tested at our own flight test laboratory. G-E precision-built products for aircraft range from tiny switchettes and relays to generators, motors, and jet engines. Completely engineered systems automatically do many jobs that ordinarily require much time and attention from pilot, engineer, and other crew members. Our specialists will gladly work with you to help you determine the right electric equipment for your job. Just call the nearest G-E office. *Aviation Divisions, Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

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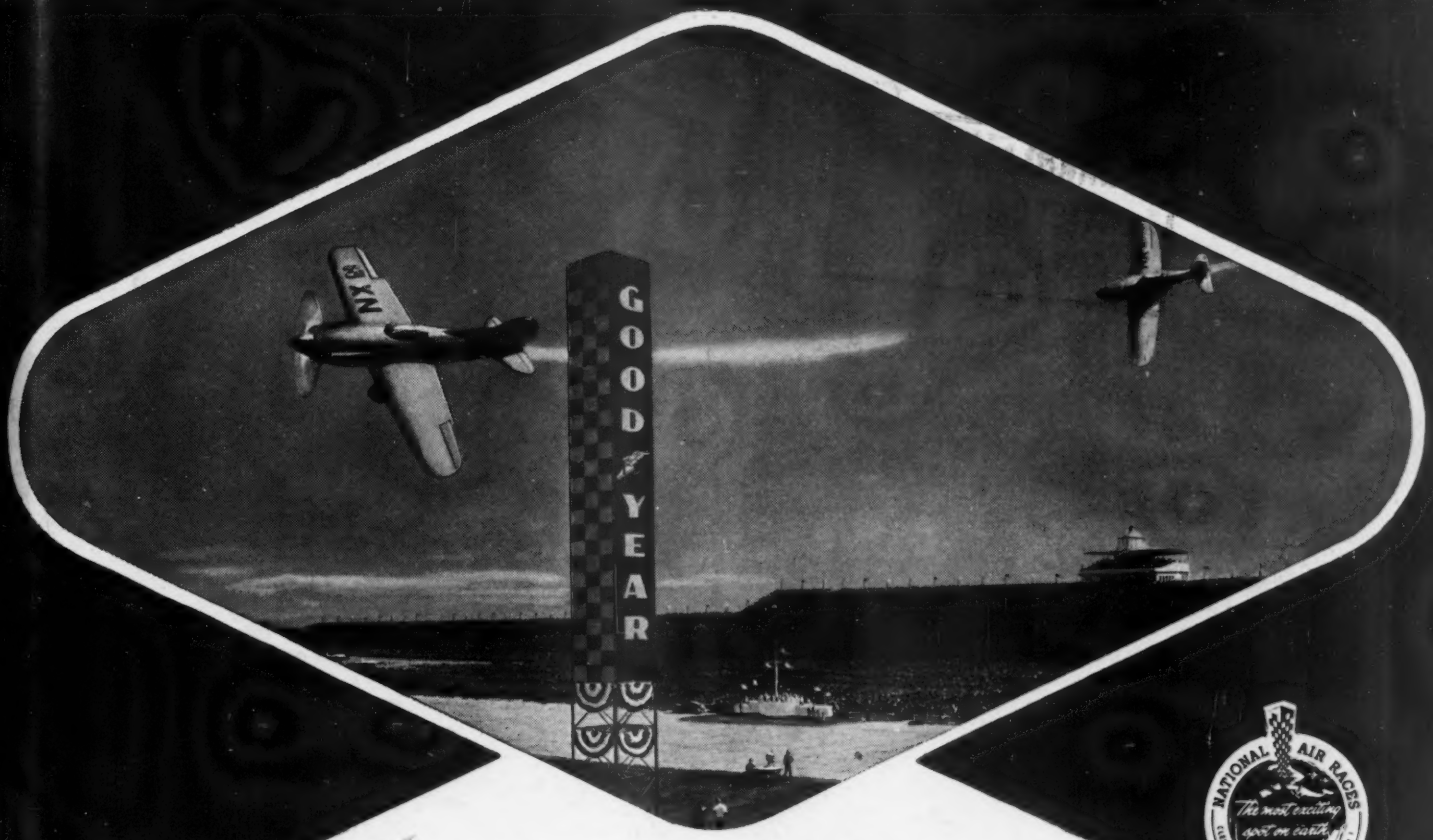
AVIATION WEEK

JULY 28, 1947

INCORPORATING AVIATION AND AVIATION NEWS

A McGRAW-HILL PUBLICATION



In the interest of progress

To encourage public interest in the development of light aircraft, to promote progress in their engineering and to stimulate research in new designs, the Goodyear Trophy Race with $25,000 in prizes is being inaugurated at the National Air Races in Cleveland on August 30, 31 and September 1.

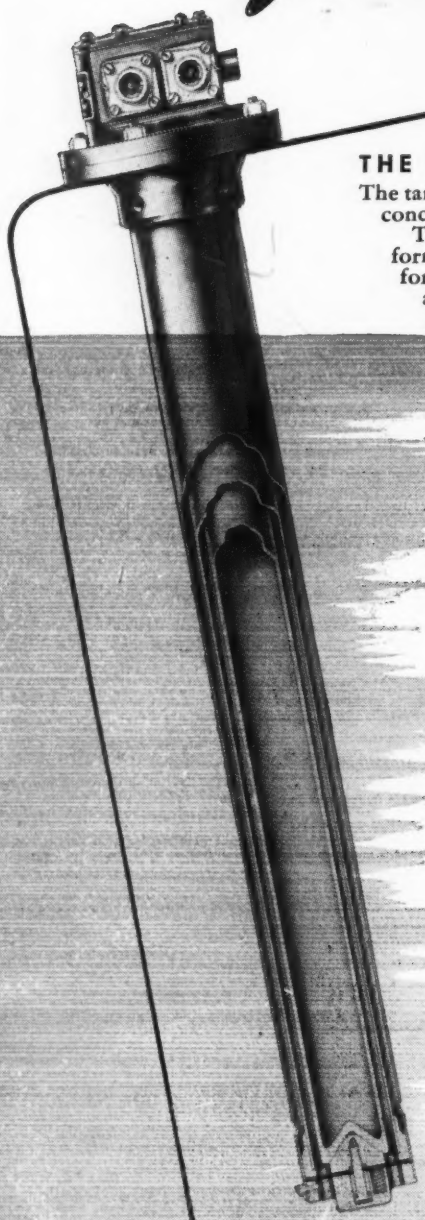
Goodyear, Aviation Products Division, Akron 16, Ohio; Los Angeles 54, California

MORE AIRCRAFT LAND ON GOODYEAR TIRES THAN ON ANY OTHER KIND

GOODYEAR AVIATION PRODUCTS

THE *New* HONEYWELL ELECTRONIC

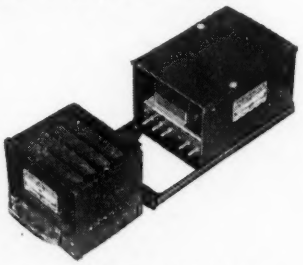
Fuel Gage



THE TANK UNIT . . .

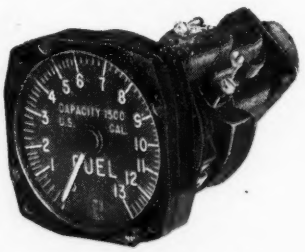
The tank unit is the fuel measuring part of the system. It consists essentially of three concentric tubes, rigidly fastened together but electrically insulated from each other. The outer tube serves as a support and protecting shield for the other two, which form the two plates of a condenser. A flange is provided at one end of the assembly for mounting the unit in the tank. The rugged construction of this unit and the absence of any moving parts or electronic components eliminate the necessity for any servicing beyond an occasional inspection.

THE POWER UNIT



Aside from the tank unit and the indicator, all electrical components are contained in the power unit which consists of an amplifier and a calibration unit mounted together on one rack. (The mounting rack is not required if a suitable shelf or rack is provided in the airplane.) The amplifier may be easily detached from the calibration unit for inspection, service, or replacement without disturbing calibration of the system. Adjustments for both *empty* and *full* calibrations are provided in the calibration unit. Full calibration is easily accomplished at the time of installation by merely connecting a standard calibrating condenser between two terminals in the calibration unit. This convenient method eliminates the necessity for filling the tanks and jacking up the wings to calibrate each installation.

THE INDICATOR



The indicator, which is designed for instrument panel mounting in a 3⅛ inch opening, registers fuel quantity in gallons at 77 degrees F. The unit is powered by a midget instrument motor which positions the pointer and the balancing potentiometer through a 7745-to-1 gear train. This speed reduction prevents the indicator from responding to momentary surges and splashing of the fuel in the tank. Yet the indicator operates fast enough to follow any normal change in fuel level and is so sensitive it registers changes as small as $\frac{1}{16}$ inch. The scale on the indicator dial is 7½ inches long and occupies five-sixths of the dial circumference. (The scale may be calibrated in pounds instead of gallons if desired.)

Minneapolis-Honeywell, Minneapolis 8,
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CREATIVE ENGINEERING
Makers of the famous Electronic Autopilot, standard on all AAF 4-engined bombers.

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DETROIT

Chemical Tools!

3 TYPES... EACH BEST FOR CERTAIN ASSEMBLIES

Just as you have a favorite wrench that is "tops" for a certain job, each one of these chemical tools is "tops" for a particular type of assembly.

FORM-A-GASKET No. 1 (a paste) sets fast but not too fast for use on large surfaces. It dries hard but does not become brittle. It's a swell product for making pressure-tight, leak-proof unions . . . even when the surfaces are warped.

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ALL TYPES OF FORM-A-GASKET PRESERVE ALL TYPES OF GASKETS!

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Right on the nose of the New Piper Cub Special

PIPER and SENSENICH—two great names linked again in a great new personal plane—successor to the famous J3 trainer. It's again the right combination for high efficiency and smooth performance! Swing a Sensenich and be sure!

Prompt repair service on wood propellers (all makes) at a Sensenich PROP-SHOP.

Standard of Performance

AIRCRAFT SENSENICH PROPELLERS

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SENSENICH CORPORATION

LANCASTER, PA. GLENDALE, CALIF.

This type oil separator, combining high efficiency and low internal resistance, has been widely adopted, not only for military planes but on commercial ships as well.

We are able to make prompt deliveries on this oil separator in any desired quantities; or we shall be glad to quote on oil separators of other types or to your own design.

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AVIATION WEEK

Vol. 47 No. 4

INCORPORATING AVIATION AND AVIATION NEWS

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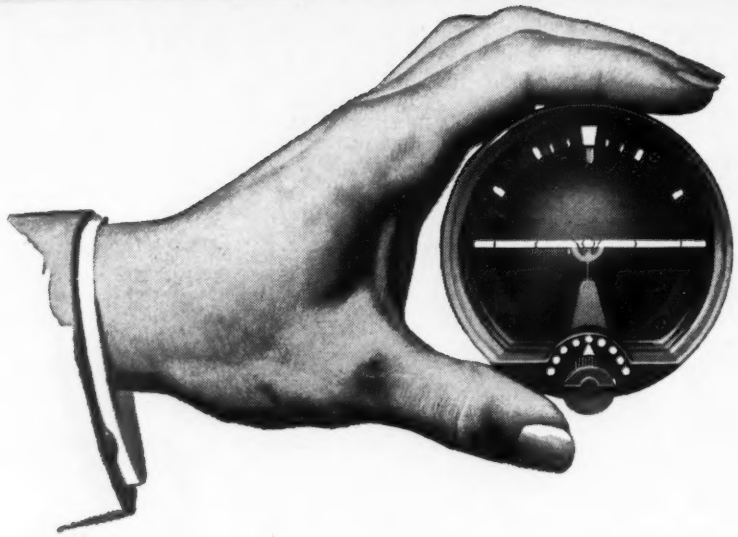
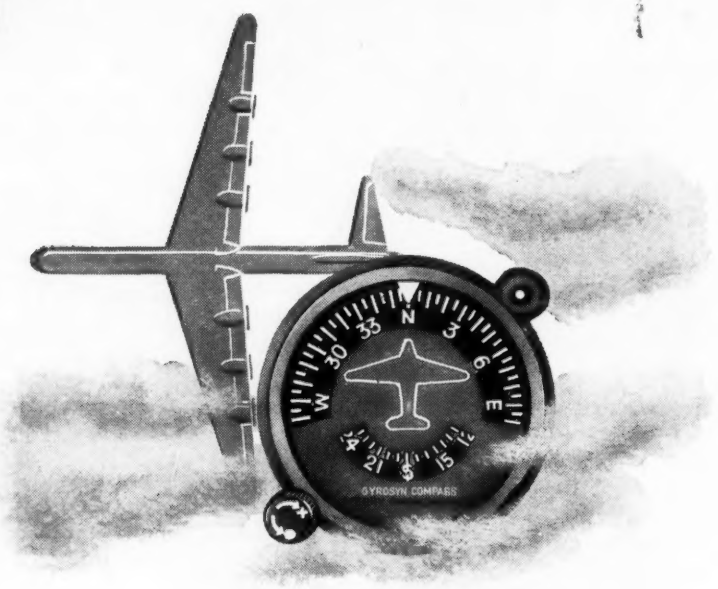


The new Sperry H-3 Gyro-Horizon...

This small-size electric flight instrument provides the same attitude indication that has been universally accepted. In addition, the Model H-3 has increased pitch sensitivity to aid the pilot in maintaining precise *attitude control* under conditions of poor visibility or "blind flying."



...paired with the new Sperry C-2 Gyrosyn Compass...

This dependable team mate of the Gyro-Horizon is the pilot's pathfinder. It synchronizes with the earth's magnetic field to give extremely accurate *directional indications* under all conditions of air turbulence. Equipped with either rotating dial or pointer indicator.

...can be grouped for pilot's convenience

These new Sperry flight instruments adapt readily to modern instrument grouping, have no flight limitations, are non-tumbling, need no caging devices. Designed for standard 3⅛ inch panel cut-out, wholly electric (AC), free of brushes. Simple, compact, light-weight, precision-built.

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AND IN THE MARINE FIELD,
Sperry Gyro-Compass is paired with Sperry Gyro-Pilot to set a ship on the straightest, shortest course, then steer that course automatically.

Sperry Gyroscope Company, Inc.

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THE AVIATION WEEK

EVERYBODY IS IN THE ACT—It looks like 1934 again, when aviation was caught in a titanic squeeze between political factions. Once again aircraft manufacturing and air transport are in the crossfire, innocent bystanders with everything to lose.

Rivalry between the White House and Capitol Hill is waxing hotter. Aviation's great ability to draw the headlines makes it the prey of publicity seekers with political motives. Climax was Truman's appointment of a commission of well known citizens to deliberate and recommend long-range aviation policies. The group was announced while Congress was still considering bills for a national air policy board.

The White House is trying to beat Congress to the punch on aviation issues.

The same conflict is apparent in improving air safety.

Investigator Dolan of the Brewster Committee beat CAB to the draw with his report blaming the LaGuardia accident on pilot error. CAB's report late last week was up before the Board for signature.

Meanwhile, the President's Air Safety Board jumped the gun on both Senate and CAB by urging revisions in the transport regulations.

STRESS IMPORTANCE—Both the President's Safety Board and the new Air Policy Commission will work at top speed to take advantage of the Congressional recess. So will Senator Brewster. This is why Chairman Landis overruled request of his fellow members on the Truman board for summer adjournment.

For about six months, the Air Coordinating Committee through its industry advisory panel, has been working on a new national aviation policy statement. Among other things, it stresses importance of U. S. aid in developing transport aircraft.

Meanwhile, Congress was shadow-boxing with an idea for a board. Concurrently, Truman began taking a deeper interest in air safety and aviation economics. It appears that CAB chairman Landis was an active adviser. One result was appointment of the special safety board.

That left the matter of economics.

The spotlight next swings to ACC, and a letter June 16 to Truman from ACC co-chairman Garrison Norton, of the State Department, discussing problems of the aircraft manufacturers in relation to national security. Norton asked the President to appoint a board.

Meanwhile, a House Bill gained favor merely giving ACC statutory authority. A Senate Bill called for a temporary board with congressmen, industry and government officials as members.

When it appeared that agreement on the Senate version was certain, Sen. Brewster went to the White House. The President made no objection to a group originated by Congress but told Brewster he thought a survey by an independent commission would be valuable too.

At the eleventh hour, Congressional action took the form of a joint Senate-House committee. Thus, two commissions will be at work on the same problem during the next five months.

Everyone in aviation prays for economic stability and public safety. The more experts who devote their abilities to these ends the better. But at this point rivalries between the two groups appear inevitable and ominous.

HOW BIG A ROLE WILL POLITICS DEMAND?—One thing does appear clearer than ever. James M. Landis, as chairman of the Truman safety commission, will work closely with the new Truman air policy committee. In this dual role he becomes the most important man in commercial aviation, the spearhead of the White House campaign. Intimates say he won't resign until he has seen the year through, rumors notwithstanding.

LIGHTPLANES KEEP SLUMPING – Summer slump in lightplane sales has continued through July. Manufacturers' shipment figures may drop below those for June. Actually, summer doldrums are nothing new. Major sales have always been recorded in the spring. Look at your prewar sales records for proof. Customer interest always slackens as good flying season nears and passes the halfway point.

Both Republic and Waco denied West Coast rumors that Marchev was leaving Republic to join Waco to take over the Seabee. Waco's Aristocraft was abandoned recently. Seabee is out of production during vacation period.

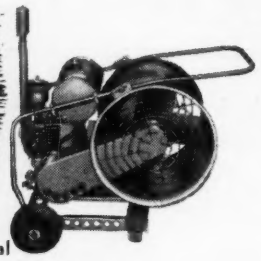
ATLANTIC BUSINESS SLIPS—Meanwhile, trans-Atlantic competition gets hotter. U. S. flag carriers who reported recently that they were booked up till fall are suddenly beating the bushes for business.

Overall traffic has dropped. Nobody knows exactly why. Maybe inexperience makes it impossible to plot busy seasons. Drop-off isn't due to accidents.

Foreign lines are capitalizing heavily on "Old World courtesy and cuisine." Some are using more luxurious American aircraft than our lines. With fares fixed on an international basis, we can't cut rates.

So our brothers across the sea are making up in frills and creature comfort for what they lack in operating efficiency. U. S. airline men say the Scandinavians, Dutch and British, in that order, are doing the best operation and maintenance. The Belgians (SABENA) and French (Air France) are probably the worst. But the American public doesn't inquire too much about technicalities which are not mentioned in the ads.

New Type **Herman Nelson**
PORTABLE VENTILATOR
(With blow-through or draw-through action)



Solves many ventilating and cooling problems in:

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- ☐ Airplanes

Write for complete details and prices.

This light-weight, high-powered, portable ventilating fan is easily wheeled from place to place. Two-way air flow permits drawing smoke, dust or gases from area, or supplying fresh, cooling air to spot desired. Equipment includes one 14" diameter by 16' length collapsible canvas duct. Powered by gasoline engine or electric motor.

THE HERMAN NELSON CORPORATION
MOLINE, ILLINOIS

The RUSCO Tog-L-Lok Seat Belt . . .

A product of RUSCO, makers of famous automotive products. This belt is considered "Standard" for light planes and is C.A.A. approved for 2000 lb. loads. Six features make it outstanding.

1. **Instant, positive action** . . . to lock or unlock simply throw lever.
2. **Dependability** . . . Positive Toggle Grip—2000 lb. C.A.A. Test.
3. **Simplicity** . . . instantaneous adjustment and release.
4. **Lightness** . . . 60" belt assembly weighs 12 oz.
5. **Fool-proof, plastic tip** . . . nothing to pull off, nothing to fray.
6. **Shock resistance** . . . no treacherous slipping.

See your aircraft supply house or our nearest branch office.

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NEWS DIGEST

DOMESTIC

Braniff Airways and Northwest Airlines have signed new contracts with Airline Pilots Association covering both domestic and overseas operations.

Kenneth C. Royall, New Secretary of War, succeeds Robert P. Patterson. Royall was formerly Under-Secretary of War.

Boeing B-29 Superfortresses, in a mass flight of more than 100 planes will fly over Chicago, Detroit, and St. Louis in an Air Force Day display, Aug. 1, while on the same day eight other B-29s are making a one-stop flight from Tokyo to Washington, and 30 other B-29s are returning from Germany where they went earlier this month on a training flight.

W. N. Bartlett, Portland, has been named Oregon State Director of Aeronautics, succeeding Leo G. Devaney, resigned. Bartlett was formerly planning engineer for the Oregon State Postwar Development Committee.

Rio Grande Valley International Airport, Brownsville, Tex. has been made a station for Mexican Customs and Immigration personnel, to simplify tourist flight clearance into Mexico.

Michigan Department of Aeronautics planes have started aerial patrols over the state, to curb reckless flying including violations of the Michigan minimum altitude of 500 ft. over both land and water.

Edgar N. Gott, San Diego, onetime president of Boeing Airplane Co., and later vice-president of Fokker Aircraft Corp. of New Jersey, president of Keystone Aircraft Corp., Bristol, Pa., and vice-president of Consolidated Vultee Aircraft Corp., San Diego, died at San Diego after a long illness at the age of 60.

FINANCIAL

Pan American World Airways System reports a 40 percent increase in gross revenue, for the first five months of 1947, over the corresponding period in 1936.

Hawaiian Airlines will issue stock for an additional $2,000,000 capital to construct improved terminal facilities, replace present flight equipment and provide more working capital.

FOREIGN

British Overseas Airway Corporation planes will refuel in midair for the London-Montreal flights, to fly the trip non-stop, beginning in October. Refuelling points will be at Shannon Airport and Newfoundland.

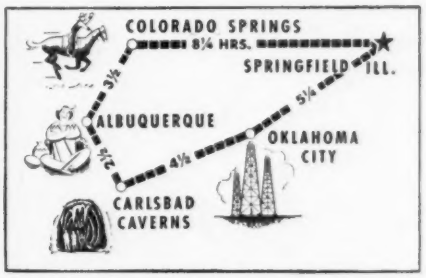
Abel Shaban, described as Africa's youngest millionaire, is planning to start a new airline between South Africa and Great Britain, and is in London working on the project. British press reports he controls 30 African companies, with combined capitalization of approximately $80,000,000.

THANKS TO THE PLANE THAT GIVES YOU *More for your Money!*

There's no end to the far-away places you can visit—the exciting things you can see and do—when you own a shiny new Cessna 140 or 120!

For here, at last, are practical, 2-place, *cross-country* airplanes . . . at light "training plane" prices (only $3245 and $2695* f. o. b. Wichita). Both give you over 120 m. p. h. top speed, 450-mile non-stop range, all-metal structure and many comfort and safety "extras". Anyone who can drive can learn to fly them. *And gas, oil, service and depreciation run about the same as on a family car.* Convenient time payments. See them!

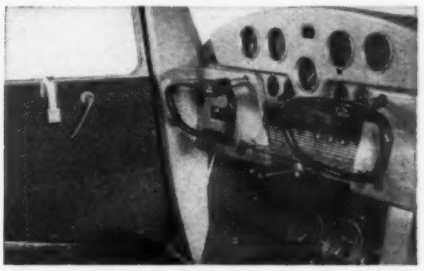
All Aboard for points West! There's plenty of room for luggage (up to 80 lbs.). Or a comfortable seat for children can be installed easily in Cessna's roomy luggage compartment.



Trips like this are easy in a Cessna. Owners report they average nicely over 100 m. p. h. and get over 20 miles per gallon from the 25 gallons of fuel in Cessna's twin wing tanks.

More comfort for your money! Beautiful upholstery. Adjustable foam rubber seats. Directional ventilation. New sound-proofing which permits normal conversation in flight!

More safety, too! Cessna's patented safety landing gear absorbs shocks—helps smooth rough fields. And the 140 is equipped with full-range wing flaps for safer landings.



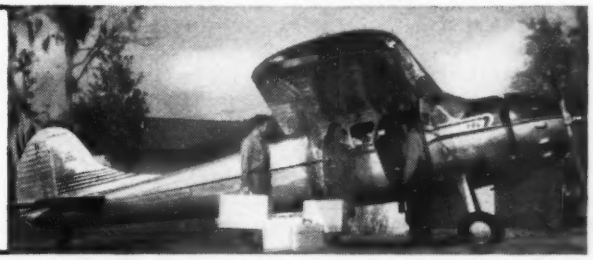
Cessna's beautiful instrument panel is shock-mounted for longer instrument life, greater accuracy. Note extra leg room, too, in the comfortable Cessna cabin.

Also See the New

CESSNA 195 and 190

AIRLINE SPEED, AIRLINE COMFORT

in Your Own 4—5 place Personal or Company Plane!



Big, fast, luxurious . . . yet surprisingly economical to own and operate! Both are all metal. Both have the famous Cessna cantilever wing and patented safety landing gear. The 195, equipped with a 300 H. P. Jacobs Engine, has a top speed of over 180 m. p. h.—a range of over 700 miles—carries 200 lbs. of luggage. (Or five people, if you're traveling light.) The 190 offers comparable performance with a 240 H. P. Continental Engine. Ideal for personal or *charter* use.

*The 120 *is the ideal training and utility plane. Less luxurious than the 140 and not equipped with starter, battery, generator or flaps.*

Cessna

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VOL. 47 • NO. 4

AVIATION WEEK

JULY 28, 1947

INCORPORATING AVIATION AND AVIATION NEWS

Truman Board, Congress Group Will Probe Aviation Industry

Rival investigations aimed at formulating new U.S. air policy; have Jan. 1 deadlines.

A surprise Presidential Air Policy Commission began preliminary organizational efforts last week, beating to the punch Congressional exponents of an Air Policy Board and leaving the industry which has long wanted such a group wondering if it is to be caught in the middle of a political fight.

The President appointed his five-man temporary body to make an inquiry into aviation policies and problems just at the time when it appeared Congress was on the point of enacting a law establishing a 12-member board to perform approximately the same function. The aircraft industry had supported the bills in the House (Hinshaw) and in the Senate (Brewster), and the President gave no indication he was not in favor of the legislation.

► **Congressional Board**—The Congressional board would have been appointed by the President and composed of members of Congress, of the Executive Departments and of industry, with a deadline of Jan. 1, 1948 for its report. The President's group consists of non-government men, only one of whom has an aviation background, and must also report by Jan. 1.

Following appointment of the President's Commission, members of House and Senate Interstate and Foreign Commerce Committees last week abandoned efforts to complete action on the Air Policy Board, and instead pushed through a resolution to set up a joint committee to study aviation during the Congressional recess. This would be titled the Temporary Congressional Aviation Policy Board and be composed of five Senators and five Representatives.

This Course was determined also by the fact that Sen. Owen Brewster, in the conference committee of the two houses that was handling the air policy bill, attempted to get the chosen instrument issue included in the scope of the board's study.

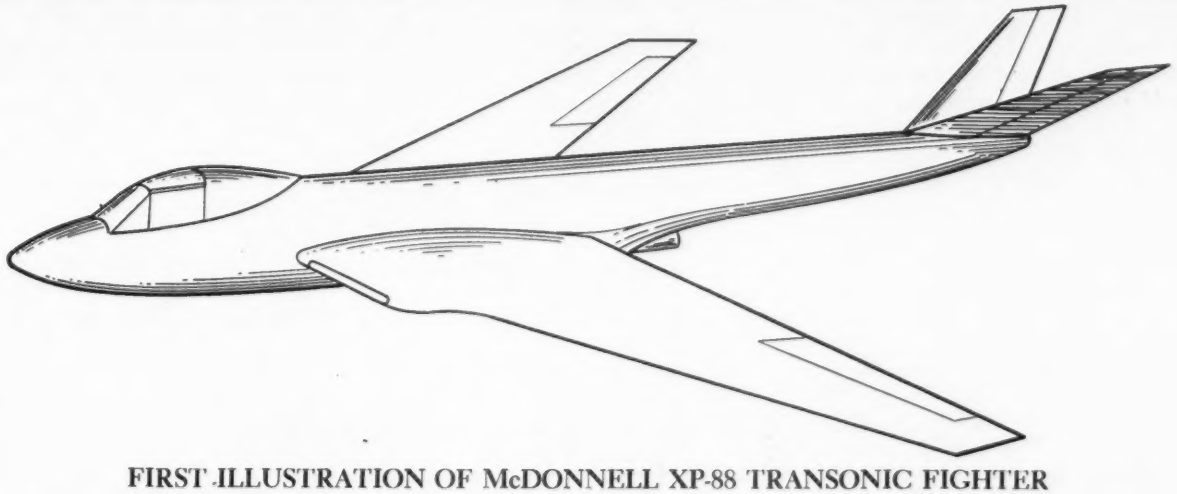
► **Jaundiced View**—Privately, some air-minded members of Congress cast a jaundiced eye on the Presidential Commission. They have two major criticisms; one, the commission is composed of men with little or no knowledge of aviation; two, it has no Congressional representation. Illustrating the cleavage in thinking, those two points are considered as constituting the Commission's chief value by those instrumental in having urged its establishment.

Because the Congress is Republican, and the executive branch Democratic, that cleavage reflects political thinking. This leaves the aircraft industry the task of assembling data for two different groups that may, or may not, follow the same approach to the problem. Under such circumstances, industry representatives believe it would be very easy to offend unwittingly either the Congressional, or the Presidential inquiry.

► **Norton's Suggestion**—The President established his commission at the suggestion of Garrison Norton, acting for the Air Coordinating Committee of which he is co-chairman. CAB Chairman James M. Landis, the other ACC chairman, is understood to support whole-heartedly the Commission plan, but left it to Norton to push in view of Landis' heavy commitments on CAB and the special air safety time.

ACC has felt for some time that an independent survey of the entire aviation situation is needed. It could not see where the utmost value could be drawn from an investigation by a board composed of members of Congress and of the government departments handling aviation. The board proposed by Congress would have been composed of agency heads.

According to Norton, who also is an Assistant Secretary of State, ACC has been able to bring together all thinking on aviation in the various executive departments, and coordinate that with Congressional



FIRST ILLUSTRATION OF McDONNELL XP-88 TRANSONIC FIGHTER

New AAF transonic fighter plane has swept wings and swept back "V" tail for minimizing compressibility effects. Pilot ejection equipment, radar navigational and gunsighting equipment is standard. Twin turbojet engines are mounted below belly and exit through nozzles shown. Prototype is scheduled to fly this year.

handling of aviation matters. The result is what he terms government policy on aviation.

▶ **Want Scrutiny**—Behind the formulation of the President's Commission is the desire to have this government policy on aviation subjected to the unbiased scrutiny of men expert in more general fields. Norton, and William C. Foster, Undersecretary of Commerce and Acting Replacement for William A. M. Burden on ACC, submitted a list of names from which the president selected:

• **Thomas K. Finletter,** Chairman, a 53-year-old New York attorney, former special assistant to Secretary of State, specialist in international and corporation law, and author of several books on corporate reorganization and bankruptcy.

• **George P. Baker,** vice-chairman, now professor of transportation at Harvard University. A former Vice-Chairman of CAB (1942), he was a colonel in World War II, and is 43 years old.

• **E. Palmer Hoyt,** 50-year-old Publisher of the Denver Post, for many years with the Portland Oregonian and during the war deputy director of the Office of War Information.

• **Henry Ford II,** Detroit, the 30-year-old president of Ford Motor Co. who in two years in the top job of one of the largest industrial empires has completely re-organized the company and strengthened its competitive position.

• **Arthur D. Whiteside,** New York, at 64 the oldest member of the Commission. President of Dun & Bradstreet, he is an authority on finance and credit.

To these men, ACC will submit its newly-framed air policy statement, which has been drafted by a subcommittee and was expected to be approved by the full group last week. It will also give to the commission, when ready, the Stanford University revision of the 1945 Report on the Aircraft Industry. These will furnish the working tools of the Commission.

Chairman Finletter last week told AVIATION WEEK that, while it was still too early to announce definite plans—especially as he had not yet met the other members of the group—he expected that the commission would appoint an executive director or secretary, and have experts for such phases as production, transport and legal. He would prefer personally that the executive director be from outside the government.

▶ **Headquarters Set**—Under the terms of the President's appointment, the Department of Commerce will furnish headquarters and staff assistance, and Finletter already has an office in the Commerce building. He was to meet with Baker and Whiteside in Washington last week.

As an indication of the possible nature of the Commission's survey, Finletter stated he was examining the records of the Federal Aviation Commission of 1934. This was the five-man body established by Congress and appointed by the President after the cancellation of the air mail contracts. Chairmaned by Clark Howell, Atlanta, Ga., publisher, and with Dr. Edward P. Warner as vice-chairman, it carefully examined every aspect of aviation and reported back to Congress with 102 specific recommendations—few of which were ever followed.

Senate Group Will Probe Hughes' Deals

The Senate's War Investigating Committee, headed by Sen. Owen Brewster (R., Me.) will spring into post-adjournment activity with hearings on government negotiations with Henry J. Kaiser and Howard Hughes in connection with the Kaiser-Hughes giant flying boat and the Hughes reconnaissance plane, scheduled to start July 28.

The Hughes investigation has been assigned to a subcommittee headed by Sen. Homer Ferguson (R., Mich.) which, it is understood, will aim to ascertain what, if any, political pressure was brought to bear through Elliott Roosevelt in the awarding of the initial government investment of $18 million in the Kaiser-Hughes flying boat and what, if any, political favors were conferred upon Hughes in the development of his D-2, D-5, and F-11 reconnaissance planes.

▶ **Truman Involved**—President Truman figures in the proceedings as Chairman of the Senate Committee which in 1943 afforded Kaiser a sounding board for drumming up public support for the giant flying boat project. Kaiser later obtained the $18 million from the Reconstruction Finance Corporation for the project, despite the opposition of the Army Air Forces and the Navy.

Last week, the Senate's Brewster Committee, which already had its investigators scrutinize Hughes' files in Southern California, served a subpoena on the estate of the late President Roosevelt, requesting the following:

(1) Memorandum, dated July 7, 1942, from the late President Roosevelt to Lt. Gen. H. H. Arnold, together with an unsigned note written in longhand dated June 27, 1942, attached to the memorandum and concerning Mr. Hughes.

(2) Memoranda, dated July 8 and July 27, 1942, from Lt. Gen. Arnold to the late President Roosevelt, concerning the Hughes twin-motored bomber.

(3) All correspondence between the late President and members of his family and the White House staff relating to Hughes, the HK-1 flying boat, or the Hughes reconnaissance planes.

(4) All correspondence between the late President, members of his family, or the White House staff and officials of the RFC, the War Production Board, War Department or other government agency, relating to the Hughes projects.

(5) All correspondence between the late President, members of his family, or the White House staff to or concerning Kaiser.

Superforts Planning Precision Arrivals

Crossing of an imaginary finish line at a precise, predetermined time after a 7,000-mile flight is the challenge to eight Boeing B-29 Superfortress bomber flight crews in a projected Tokyo-Anchorage-Washington, D. C. flight as part of the nationwide Air Force Day celebration.

Critical moment of the flight will be when the formation passes between Washington Monument and Lincoln Memorial in Washington, D. C. precisely at noon Aug. 1.

The flight is scheduled to leave Tokyo at 1:30 A.M. EDST July 31 and to land at Elmendorf Field, Anchorage, Alaska 15 hr. 48 min. and 3,575 miles later. A maximum of three hours will be allowed for refueling and the 3,540-mile hop to Andrews Field, Maryland, AAF Strategic Air Command headquarters, will require 15 hr. 36 min.

Containing a 20-man crew, including spare pilots and navigators to relieve duty crews as required, each of the B-29's will fly line astern about 4½ miles apart until they reach the Martinsburg (W. Va.) radio area, where they will move up into formation for the flight over Washington. The flight is a routine transfer of the unit, which has been standard AAFSAC practice for nearly a year. Monthly rotation of B-29 crews in Tokyo has provided thousands of hours of Tokyo-Alaska training time for planes and crew and the 7,000-mile flight will introduce only one new element—precision of timing—into the operating techniques now employed.

Fleet Suspends Personal Plane Production Program

Slackening of customer demand for personal planes in Canada as well as in the U. S. is indicated by decision of Fleet Manufacturing & Aircraft Ltd., to suspend production of the Fleet Canuck, high-wing two-place monoplane, at the Fort Erie, Ontario plant. Deliveries will be made out of inventories already on hand, with production resumption depending on when the stocks are exhausted and the demand, Thomas Y. Smith, managing director, announced.

At peak production last year the plant employed approximately 600. This spring approximately 250 were employed and the number has now shrunk to 175. Smith said the letdown in operations has been cushioned by sub-contract work for other companies.

Shareholders of Fleet Aircraft Ltd., which sold its assets to Fleet Manufacturing & Aircraft, Ltd., last August, are considering liquidating the former company and surrendering its charter at a special meeting to be called soon.

Mooney Prototype Has Fast Climb

Recent flight tests show engineering development of the prototype Mooney M-18 single seater has raised the rate of climb to 500 ft./min. although the little Crosley automobile engine, which powers the plane is only rated at 25 hp.

President Al W. Mooney, of Mooney Aircraft Co., Wichita, says the engine has produced as much as 35 hp. and he expects to get between 28 and 30 hp. in a production plane, with suitable propeller. Four new-design Goodyear wedge belts transmit power from engine to propeller at a 2.05 reduction ratio from the engine's 4500 rpm. Engine, plus accessories weighs 98 lbs. (See engine photo.)

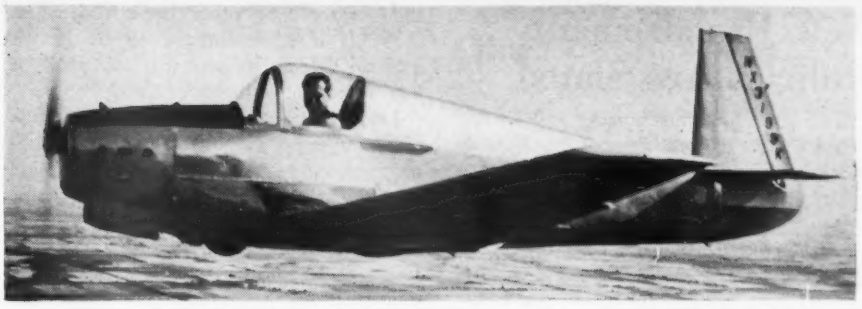
▶ Flight Tests—In flight tests at Wichita municipal airport plane reportedly has flown to 13,000 ft. ceiling, later is expected to reach 18,000 ft. M-18 cruises at 90 mph. with fuel consumption of only 1¾ gal.hr. using 80 octane gasoline. Top speed is reported over 100 mph.

In an effort to hold down experimental costs prototype is composite construction, using wood and fabric in wing, all-metal nose, and plywood aft of cockpit in fuselage and tail. Company now plans to build a "moderate quantity" of M-18s at a plant near the Cessna Wichita plant, beginning in August. These will be pilot models, for trial by dealers and distributors, before full production begins.

▶ New Market—A large new market of would-be flyers who can't afford today's lowest priced planes offers prospects for the Mooney plane, which "must sell for under $1,500," the president says. Test model does not have starter or manifold. Production model will have manifold and possibly a mechanical hand starter, but will not use electric starter.

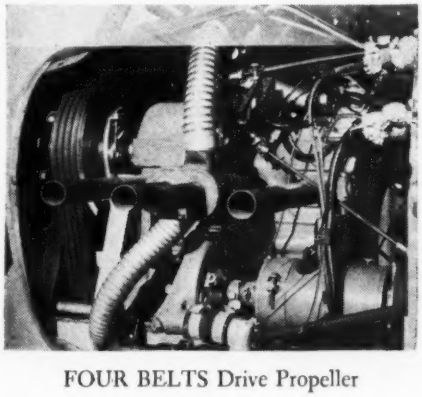
Other engineers have tried periodically to use automotive engines in lightplanes, but have abandoned the effort after costly, futile experiments. Mooney's adapted powerplant, he reports has already made 150 hr. test block run with only two exhaustvalves replaced.

If his powerplant proves successful in quantity usage the novel arrangement may be followed by other manufacturers.



$1,500 OR LESS for Mooney Single-seater

LINES RESEMBLE Culver Target Planes



FOUR BELTS Drive Propeller

COMPOSITE METAL and Plywood Construction

New Procurement Policies Are Slated

Two measures, modernizing and streamlining outmoded procurement practices of War and Navy Departments and the Coast Guard, last week were slated for enactment before the July 26 date set for Congressional adjournment.

One bill would strike out two provisions of the Vinson-Trammell act of 1934: the requirement that 10 percent of all Naval aircraft be procured from government-owned plants; and profit limitation of 12 percent on Naval and Military aircraft contracts.

The other measure, sponsored by Chairman Chan Gurney (R., S.D.) of the Senate Armed Services Committee and Chairman Walter Andrews (R., N.Y.) of the House Armed Services Committee, codifies and modernizes laws, rules, and regulations relating to War, Navy, and Coast Guard procurement that have accumulated over a century. While laying down a policy of competitive bid contracts, with awards going to the lowest bidder, the legislation gives legal sanction to negotiated contracts under specified circumstances. These are enumerated as follows:

(1) During a national emergency, or if public exigency will not permit delay incident to advertising for competitive bids on contracts.

(2) If aggregate amount of a contract does not exceed $1,000, or if a contract is for personal or professional services.

(3) On contracts with educational institutions for training personnel.

(4) On contracts for experimental, developmental or research work or supplies for such work. Each agency head would be required to file reports with Congress at six month intervals listing and describing the terms and nature of all research and developmental contracts negotiated.

(5) Contracts for materials—including aircraft, parts, instruments, and accessories, the nature of which, for national security reasons, should not be publicized.

(6) Contracts for standardized technical equipment, which, in order to assure interchangibility of parts with already-procured equipment, must be purchased from the same producers.

(7) Contracts for supplies of a technical or specialized nature—such as aircraft, requiring a large initial investment and an extended period of preparation for manufacture, on which an award to a new producer would involve a duplication of preparatory effort.

(8) If and when an agency head determines that competitive contract bids have not been independently arrived at and that a preferable arrangement could be made through negotiation. Senate Armed Services Committee estimated that this stipulation would break collusive bidding, follow-the-leader pricing, rotated low bids, identical bids requiring drawing of lots, uniform estimating systems, and refusal to classify the Government as other than a retail buyer.

(9) If it is determined to be in the national defense interest that any plant be kept in production.

Legislation also authorizes free delegation of procurement authority to promote joint procurement by armed services. It requires that all competitive bids evidencing collusive action on the part of bidders be turned over to the Attorney General for appropriate action under anti-trust law, and writes out standards and procedures for competitive bid procurement.

Brewster Seeks CAA-CAB Changes

Legislation revising the CAA-CAB organization for regulation, enforcement, and investigation of air safety matters was introduced last week by Sen. Owen Brewster (R., Me.), Chairman of the Senate Interstate Commerce Committee's aviation subcommittee.

Under the measure there would be a clear demarcation of jurisdiction between the two agencies in the air safety field. CAA's duties would be to lay down, promulgate and administer safety regulations. CAB would have the adjudicative function of suspending and revoking certificates after notice and hearing and would have a free-hand to make comment or recommendation on the CAA's administration of air safety. "CAB, in fact, would become an independent air safety board," Brewster said.

Brewster anticipated that his proposal would draw general support from the airlines, pilots and aviation industry but "doubted" that the President's Special Air Safety Board, headed by CAB chairman James Landis, would endorse it.

Aviation Exports Reach New Peaks

Exports of both aircraft and engines continued to rise in May to new highs for the year, aircraft shipped out of the country during the month numbering 327, valued at $9,415,821, and engines, 849, valued at $2,499,148.

Number of personal planes exported during the month was 190, nearly 12 percent of total shipments—domestic and export—during the month. Value of personal planes exported was $824,021, more than 14 percent of the value of total shipments during the month. Industry view for some time is that lightplane manufacturers should export annually at least 15 percent of their production.

Used and surplus aircraft exported in May totaled 61, down slightly from April exports in this category. However, used and surplus engines continued to constitute the bulk of engine exports, totaling 711 in May against 242 in April. Largest number of new engines shipped, 89, was in the 1,000-2,499 hp. class. There were only eight large transport planes exported during the month.

AVIATION CALENDAR

July 31-Aug. 1—AIA Eastern Regional Traffic Committee, Hotel Schroeder, Milwaukee.

Aug. 1-2—Parks College reunion, 20th anniversary, East St. Louis, Ill.

Aug. 7-8—Annual summer meeting, Institute of the Aeronautical Sciences, Los Angeles.

Aug. 7-8—1947 convention, National Flying Farmers Association, Oklahoma A & M College, Stillwater, Okla.

Aug. 11—International Air Transport Association, tariffs and schedules subcommittee, Paris.

Aug. 13—CAA-sponsored State Aviation Forum, Nashville, Tenn.

Aug. 16—ICAO communications working committee, Mexico.

Aug. 16-17—Oakland Air Show, 20th anniversary of Dole flight, sponsored by Junior Chamber of Commerce, Oakland, Cal.

Aug. 19—International Air Transport Association, financial committees, Paris.

Aug. 21-22—West Coast transportation and maintenance meeting, Society of Automotive Engineers, Biltmore Hotel, Los Angeles.

Aug. 25—International Air Transport Association, financial-accountancy and statistical subcommittee, Paris.

Aug. 28—International Air Transport Association, financial-clearing house subcommittee, Paris.

Sept. 1-10—International Air Transport Association technical conference, Nice.

Sept. 3—International Air Transport Association, financial committee, Brussels.

Sept. 6—Anglo-American conference, Institute of the Aeronautical Sciences and Royal Aeronautical Society, London.

Sept. 8-12—Second annual conference and exhibit, Instrument Society of America, Hotel Stevens, Chicago.

Sept. 15-17—Air Force Association, first annual convention, Columbus, Ohio.

Sept. 16—ICAO rules of the air and air traffic control meeting, Montreal.

Sept. 16—International Air Transport Association, technical committee, Nice.

Sept. 16-18—Second Regional CAA conference, Atlanta.

Sept. 17—ICAO meteorological division, Montreal.

Sept. 23—ICAO aerodromes, air routes and ground aids division, Montreal.

Oct. 2-4—Autumn aeronautics meeting, Society of Automotive Engineers, Biltmore Hotel, Los Angeles.

Oct. 3-4—Arizona State Aviation Conference, Douglas, Ariz.

Oct. 6—International Air Transport Association, executive committee, Rio De Janeiro.

Oct. 7—International Air Transport Association, traffic committee, Rio De Janeiro.

Oct. 14—International Air Transport Association, third annual general meeting, Petropolis.

Oct. 15-18—Montreal Board of Trade, second annual air conference, Montreal.

Oct. 20—International Air Transport Association, executive committee, Petropolis.

Oct. 20—Air Industries and Transport Association of Canada, annual meeting, Gray Rocks Inn, St. Jovite, Quebec.

Oct. 20—ICAO meeting on multilateral agreement on commercial rights, Petropolis.

Oct. 24-26—"Air Day in Texas" aviation show, Harlingen, Texas.

Oct. 26-28—National Association of State Aviation Officials, Fort Worth, Texas.

Nov. 4-7—National Airport Show and Institute, sponsored by Air Foundaion and National Aeronautic Association, Municipal Auditorium, Cleveland.

Nov. 6-7—Fuels and lubricants meeting, Society of Automotive Engineers, Hotel Mayo, Tulsa, Okla.

Nov. 18—ICAO search and rescue division, Montreal.

Nov. 19-22—Fifth Annual National Aviation Clinic, Springfield, Ill.

Dec. 1-3—Air transport meeting, Society of Automotive Engineers, Hotel Continental, Kansas City.

GCA Gift to CAA

Outright gift of three Ground Control Approach units by the Army Air Forces saved the Civil Aeronautics Administration's experimental GCA program from curtailment threatened by Congressional cuts in air safety appropriations.

In addition to the three complete GCA units now operated by CAA at Washington, New York and Chicago, AAF offered a complete set of spare parts for each installation. CAA previously had indicated it would be forced by lack of funds to close at least one of the three installations.

As a result of AAF action CAA now promises to put all three GCA units on a 24 hour basis by Aug. 1. There have been bitter complaints by airlines and GCA manufacturers that the sets operated by CAA's Region One were not available full time for practice and training operations.

CAA said lack of funds forced refusal of an AAF offer to loan 20 military GCA sets for commercial operation but that some sets might be made available for training CAA personnel at its Oklahoma City base.

Meanwhile the Air Transport Association moved ahead with plans to install GCA at Shannon, Eire, to make the North Atlantic route completely equipped with GCA facilities. The Shannon set will be loaned by AAF and operated by personnel of American Overseas Airlines with expenses shared by all airlines using the field. A similar arrangement at Gander, Newfoundland, has been approved for another year's operations after CAA lowered minimum weather requirements by 100 ft. of ceiling and a quarter mile visibility.

CAA Offers Eight More Airports Grants

CAA has made offers of grants-in-aid under the Federal Airport Act to eight more sponsors, bringing the total to 18.

Meanwhile, the Miami, Fla., Port Authority has rejected offer of CAA financial aid for Tamiami Airport, claiming that there were so many qualifications attached to the federal offer of $32,000 as to make it ineffective.

This is the first reported instance of its kind, although for months many persons in touch with local affairs throughout the country have insisted that attitude is prevalent.

New projects for which CAA has offered grants-in-aid (sponsors' shares are as shown in CAA announcement in January, and may since have been changed):

- **Mt. Vernon, Ill.**—Federal, $71,700, sponsor, $71,300; acquire land, improve class I field to class II.
- **Danville, Ill.**—Federal, $258,340, sponsor, $260,000; construct class III field.
- **Marion, Ill.**—Federal, $199,400, sponsor, $165,000; grading, drainage, lighting, etc. class III.
- **Salem, Ill.**—Federal, $51,000, sponsor, $23,000; grading, drainage, lighting, etc. class II.
- **Alton, Ill.**—Federal, $256,300, sponsor, $253,375; grading, drainage, paving, improve class I to class III.
- **Toledo, Ohio**—Federal, $254,520, sponsor $197,750; grading, drainage, paving, lighting, etc. class III.
- **Houghton, Mich.** — Federal, $341,000, sponsor, $336,080; acquire land, construct class III field.
- **Midland, Mich.**—Federal, $60,000, sponsor, $60,916; acquire land, construct class II.

The original grant to Plainview, Tex., of $75,000 to improve a class II field (Aviation Week, July 7) has been raised to $80,000.

AAF Plans Test With 42,000 Lb. Bomb

A 42,000 lb. bomb, largest ever built, is scheduled for tests within the next few months on a range within the United States. The bomb, which weighs more than a fully-loaded Martin 202 transport, is not a penetration or armor piercing type, but has been designed by the AAF for general demolition purposes.

Tests will be made with dummy bombs loaded to the 21-ton design weight but containing no explosives. They will be used to prepare ballistics tables for the Norden bombsight in preparation for future live tests. The Consolidated Vultee B-36A is the only airplane now capable of carrying the new monster bomb on a tactical mission.

AAF has already launched a program of penetration bomb tests with new versions of the 25,000 lb. Amazon and Samson bombs, largest in existence today. Thirty of these giant bombs will be dropped by Boeing B-29's of the AAF Strategic Air Command, stationed at the Giebelstadt Germany, on a German submarine assembly factory near Bremen. Three B-29's with specially trained crews will carry out the tests.

Known as "Project Harken," the experiments are a continuation of "Operation Ruby" carried out in 1945 and 1946 by AAF B-29's and Boeing B-17's against Heligoland and Farge. Heligoland was destroyed recently by underground explosives. Bremen was chosen for the new tests because of the 24-ft. thick reinforced concrete walls and ceilings of the U-Boat factory. After each drop, AAF and RAF technicians will assess the damage and effectiveness of the huge bombs. Upon completion of the tests, the group will prepare a final report analyzing the value of the new bombs against heavily reinforced targets.

Ten practice models of the 12½-ton bombs were previously dropped at Muroc Army Air Base, Cal. as crew training. In addition, each crew will be allowed to drop one dummy cast iron bomb on Bremen prior to releasing the live bomb.

Graddick Leaves United for Slick

Charles P. Graddick, assistant to United Air Lines' vice president in charge of administration, has resigned to become assistant to the President of Slick Airways, San Antonio, Texas. Earl Slick, president of the uncertificated cargoline, said the appointment was part of a plan to strengthen his staff preparatory to the company's expected transition from contract to common carrier status Aug. 1. M. L. Anderson, formerly Braniff Airways' general traffic manager, was named sales manager of Slick soon after the Graddick appointment.

Graddick

Martin Union Battle

Glenn L. Martin Co. has been made a target by the International Assn. of Machinists in its drive to increase its membership from 630,000 to 1,000,000 by next May, when the union will be 60 years old.

The I. A. M. obtained from the National Labor Relations Board a bargaining election before Aug. 21 among the almost 7,000 production maintenance, garage and cafeteria employees who have been represented by the C.I.O.'s United Automobile Workers since 1943.

Martin has signed yearly contracts with the U.A.W.-C.I.O., the last one on March 11, 1946. A previous attempt to wrest the Martin agreement from the C.I.O. union was lost by the I.A.M., an independent union, in 1944. Another independent union, American Aircraft Workers, Inc., was denied a place on the election ballot because its request was filed too late and because it did not show it represented a sufficient number of employees to warrant consideration with the other two unions.

The U.A.W.-C.I.O. and the I.A.M. long have been rivals for the right to represent workers in aircraft production. The I.A.M. claims three times as many as the C.I.O.

The company was in negotiation with the U.A.W. before and after expiration of the contract in March, but discussions finally were suspended. At one time, the union voted approval of a strike vote, but the vote was never taken. Martin now cannot undertake new negotiations until after N.L.R.B. certifies a union or the employees vote against both unions.

Navy, Coast Guard Pressing For 'Copter Night Operations

Experiments with new instruments may increase utility of rotary wing aircraft; No CAB regulations.

A 50 percent increase in helicopter utility and its transition to an all-weather operations is promised by new developments pointing towards its operation at night or under conditions of restricted visibility, from which it is currently barred. The night flying helicopter has been the subject of recent CAA-Industry discussions and both the Navy and Coast Guard are pressing experimental programs designed to provide early solutions to instrumentation and lighting problems, which comprise the present major hurdles.

Neither the Bell 47 nor the Sikorsky S-51 are licensed, at present, for night or restricted visibility operation. Los Angeles Airways certificate for helicopter mail delivery is for daytime operation insofar as the Post Office Department desires only to handle airmail during the day it is mailed or received. The Chicago and Boston area certificates will probably be on this same basis.

▶ **No Regulations**—CAB has established no regulations concerning helicopter position lights or instrumentation but stands ready to examine any proposal or flight test article submitted by a helicopter manufacturer, on the basis of which a uniform policy may be established.

The Army, Navy and Coast Guard have frequently flown helicopters at night but normally only under contact conditions provided by a visual point of reference. The present stability difficulties of the helicopter render instrument readings unreliable due to lag in the indications following a displacement of the aircraft. Although steady flight reduces the importance of lag, transition and hovering flight magnify lag into a serious problem. Present instruments indicate only the attitude of the fuselage with respect to fixed reference planes.

▶ **Instrument Experiments** — The Coast Guard has been experimenting with a special instrument consisting, essentially, of a gyro horizon mounted horizontally in such a manner as to indicate the attitude of the aircraft in the horizontal plane. This provides an indication of whether the helicopter is moving fore of aft, or the tail is swinging to the left or right. In combination with a conventionally mounted gyro horizon, which indicates movement of the nose up or down and fuselage rotation to left or right, a comparatively complete indication of the attitude of the aircraft is available. However, this system is also susceptible to lag and provides an indication of fuselage attitude only. The major instrument required is an indicator of the rotor plane attitude, which more directly determines the direction of movement of the aircraft than does the fuselage.

The Navy is developing a number of systems for a helicopter automatic pilot system, most promising of which consists of an electronically controlled intelligence unit and hydraulically operated control units. However, the problem of helicopter stability renders this program complex and a satisfactory solution to the autopilot problem is not optimistically expected until helicopter stability problems are more thoroughly understood.

▶ **Lighting Problem**—The problem of helicopter lighting is under investigation by the Navy and a number of systems was demonstrated recently at N.A.S. Patuxent. Basis of the Navy approach is a lighting system which accurately identifies the craft as a helicopter while in night flight. This has resulted in fixed rotor tip lights which generate a lighted circle, or "halo", and which is, obviously, unmistakable. Major difficulty experienced to date with this syster is bulb filament failures due to the high centrifugal forces on the rotor tips. A series of steady and intermittent, white and colored fuselage lighting combinations have been investigated and both visual and psychological studies are being made of these combinations.

CAA does not see the necessity for the identification of the craft in night flight as a helicopter at present and is willing to accept a conventional lighting system upon demonstration of its effectiveness. Landing lights will probably be an integral part of this lighting system.

▶ **Patent System**—The problem of "left-red, right-green" colored lights on the rotating blades of the helicopter presents obvious difficulties. One solution has been advanced by Everett R. Steward, Glendale, Calif. inventor, who has just received a patent on a system which permits the rotor tip light to show green on the advancing (right) arc and red on the retreating (left) arc of rotation. A collector ring on the rotor shaft is energized from the fuselage power supply through a brush assembly. Above the collector ring is a segmented collector, which completes a contact as each segment passes a brush assembly, thereby lighting the required bulb at the proper position on the arc of blade rotation.

The principal feature of the helicopter—safety—would be substantially sacrificed if fixed wing visibility minimums were to remain as basic helicopter requirements. The integration of the helicopter with the airways and all-weather landing aids is essential but cannot be manifest until stability, instrument and lighting problems are solved. Urgency of the problem is pointed up by the revelation that the Navy has a number of tactical missions on tap requiring the operation of helicopters at night and in restricted visibility conditions.

Movie 'Copter

A new field of helicopter utility—motion pictures—is predicted by Lawrence D. Bell, President of Bell Aircraft Corp., following a studio preview of an experimental film. The film was made from a Bell helicopter, owned by the Armstrong-Flint Helicopter Co., used as a camera platform.

"From what I have seen, I predict that the helicopter within a matter of months will become a standard piece of studio equipment," Bell told AVIATION WEEK. "It offers angle shots that producers never dreamed might be possible. Also it gives a studio the opportunity of photographing outdoor location scenes that today might cost up to $50,000 in special ground handling equipment for the cameras."

Studio technicians, however, point out that problems of vibration, noise and wind will have to be licked before widespread use of the helicopter as a camera platform is practical for motion picture work.

Baumann Brigadier Makes 20 Test Flights

The Baumann Brigadier, twin-engine, 5-place transport, has completed 20 test flights in its first three weeks of operation over Southern California and J. B. Baumann, designer, has expressed complete satisfaction with its stability and performance. The all-metal monoplane has been flown at indicated speeds ranging from 40 to 170 mph. under perfect control. The stall is reported to be gentle and without wing-dropping tendencies.

Landing speed without flaps with a load only 100 lb. under the design gross weight of 3,250 lb. is 50-55 mph. and the Brigadier can climb at 47.5 mph. with this load. In brief spin tests, recovery after 2½ turns of the spin, has been accomplished in ¾ turn.

Although oil cooling difficulties reported earlier (AVIATION WEEK, July 14) have been partly alleviated by additional louvres, Baumann is designing a set of oil coolers weighing 7½ lb. each for installation on the two Continental engines. He had originally hoped that crankcase cooling alone would prove adequate.

A second airplane is under construction for static load tests and Baumann expects to be ready to begin CAA certification tests within nine months.

Major Australian Plants Are Busy

MELBOURNE—Though the humming activity of the war years has ceased, all four major Australian aircraft plants are booked with orders to keep a skeleton staff busy on construction and development for many months to come.

Gradual displacement of wartime models by postwar designs, including jet propelled craft, calls for retooling at several plants.

▶ **Commonwealth Aircraft Corp.,** Melbourne: established in 1936, CAC is allied with the Broken Hill proprietary steel interests. Technical know-how was originally furnished by North American Aviation Inc., but progressively Australian designs and tooling plans were adopted. Engines, however, still are imported from the U. S. About 1,300 planes were flown from the CAC assembly plants over the war years.

CAC now is busy on 100 Mustang fighters (more than were produced during the war) and is seriously planning to crash into the power plant field with negotiations with Rolls-Royce for production of nene jet engines reported approaching the final stage.

▶ **Beaufort Dept. of Aircraft Construction,** Melbourne: A more recent World War II creation mainly dependent on English techniques, tooling and components, it has produced 700 Beaufort bombers, 364 Beaufighters and 10 Avro Lincoln bombers. Since VJ day it has delivered twelve Lincolns and is gradually clearing up an order for another seventy at the rate of one-and-a-half a month.

It is claimed that 350 modifications have gone into the design of the Lincoln during the past twelve months. One of these is an Australian-invented hydraulic damper which eliminates rear wheel shimmy.

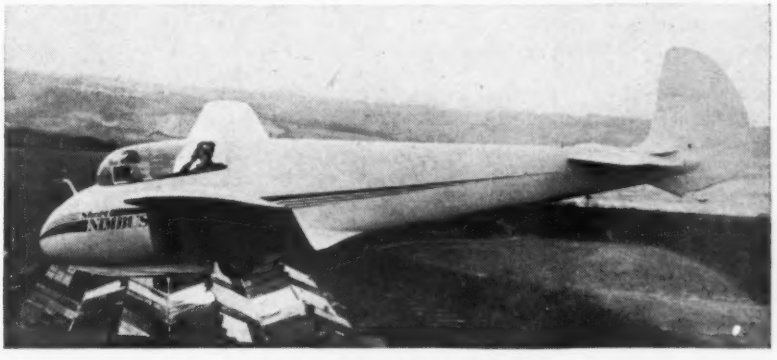
Tudor II transports are still on the drawing boards, and actual production must await arrival of machine tools from England and the U. S.

▶ **Lidcombe Government Arsenal,** New South Wales: Part of the Lidcombe arsenal in the Sydney area, the factory's postwar plans include production of Rolls-Royce Mark 102 Merlins, to replace Mark 85 Merlins in later Lincolns.

▶ **De Havilland Airsraft Co.,** Sydney: De Havilland's Australian organization for parts manufacture, service and repairs was turned into a sizeable production unit during the war which turned out 1,070 Tiger Moths and 300 planes of other types, mostly powered with engines supplied by General Motors' Australian subsidiary. De Havilland's main postwar project is the production of 50 Vampire fighters for the RAAF.

SWISS SEABEE

First Republic Seabee amphibian to arrive in Switzerland is shown beached at Lake Thoune, following its assembly from parts shipped from American factory. Plane will be used by Mido Watch factory at Bienne, for business travel. Export market for amphibians is regarded as good in Switzerland because of large number of lakes.



NEW BRITISH GLIDER

First low wing tandem sailplane to be built in England is Short Nimbus. A dual-control training craft, it has monowheel landing gear and, according to manufacturers, incorporates "several other refinements not usually found on sailplanes." (Flight photo)

NEW ITALIAN PUSHER

Shown at recent Milan fair was this small single-place pusher built by Alaparma, Note monowheel landing gear with outriggers near wingtips and nose and tail skids. Reported to have a cruising speed of close to 100 mph. craft is expected to sell for equivalent of about $4,000. (Wide World photo)

Manufacturing Status Improving In Face of Deficit Reports

Long range position seen bettered by move to establish air policy as Congress ups procurement appropriations.

While aircraft manufacturers' reports continue to reflect deficit operations, there is increasing evidence of definite improvement in the industry's fundamental position and long range outlook.

A constructive government attitude appears in the making with anticipated approval of the Brewster bill to establish a national air policy board. Congress has shown a definite change of heart toward both Army and Navy, as is manifest by material increases in aircraft appropriations voted by the Senate.

This apparent reversal in the trend of official attitude toward the aircraft builders is vital to the industry's ultimate survival, for the industry is almost completely dependent on military orders since it can hardly exist on commercial business.

▶ **Billion Dollar Backlog**—A survey shows that the aircraft manufacturers now can anticipate an aggregate military backlog of around $1 billion to sustain operations up to June 30, 1948. A little less than one-fourth will be expended on research projects. This volume should be available regardless of the trend of general business conditions.

What happens to a company heavily engaged in production of commercial transports is revealed by the recent report of Douglas Aircraft Co. For the six mo. ended May 31, the company showed a net operating loss of $6,712,307. After applying a tax carryback credit of $5,960,000 the loss was reduced to $752,307. This is in contrast to the net income of $2,610,261 cleared in the corresponding six mo. of last year. An accelerated production rate of 2½ DC-6's was reached in the second quarter. All told, 48 DC-6's were delivered up to July 1. The initial group of deliveries of this new transport type has had to absorb a particularly high portion of the engineering and development expense. Such write-offs taper down with each succeeding delivery of aircraft.

Evidently it is Douglas policy to amortize all such development expense as rapidly as possible. This arrangement results in an accounting loss on current plane deliveries to be replaced by profits at the end of the year. Nevertheless, the company anticipates that the cumulative losses for the first six mo. will be somewhat increased during the last half of the year.

This is a very conservative accounting policy and in contrast to that followed by other builders who amortize development and engineering expense uniformly over a given production program.

▶ **Bank Loans**—To assist in meeting large cash requirements, Douglas borrowed $10 million under its bank credit arrangement. At the end of May, net working capital amounted to $58,151,182, the bulk of which —$42,826,454—was accounted for by inventories and work-in-process. A year earlier, inventory position totaled $18,525,375 and two years previous but $8,074,853.

The huge inventory position necessitated by commercial production is highlighted by the comparative sales in recent years. For the six mo. ended May 31, 1945, total sales of $439,845,000 were achieved—mostly military. Two years later, sales of about one tenth that amount required an inventory position four times as large.

As Douglas increases its deliveries of the DC-6, its inventory position will be reduced and its cash balances restored, thus pointing to an early retirement of the bank credit.

Unfilled orders for Douglas at May 31, 1947 amounted to $165,039,000 compared with $200,538,000 at the end of the first quarter. About half of the current backlog is represented by military orders, including research projects.

The Douglas experience has confirmed the view of many industrial observers that without the government footing the bills, most aircraft companies are incapable of operating profitably on commercial business alone.

▶ **Policy Needed**—However, the implications are far more significant in that the industry suffers from want of a long range planning program. It is for this reason that much encouragement is being engendered by the probable creation of a national air policy board.

The Brewster bill would create a board which would investigate and make recommendations for the maintenance of an adequate aeronautical manufacturing industry. Among other things, it would be expected that government purchasing policy would be immeasurably clarified, and stability introduced. Such a policy could very easily permit the aircraft builders to operate at a reasonable profit level.

▶ **See Greater Stability**—One of the hoped-for objectives would be uniform production levels. The irregular spacing of contracts has had very detrimental effects on the industry. In order to obtain any military orders, the aircraft builder has had to maintain an expensive engineering department, whether or not it was fully occupied.

Of greater cost significance is the problem of financing new aircraft designs. The development of new aircraft models entails the expenditure of substantial sums, with major projects easily running as high as $30 million. Such development expense can hardly be borne by the industry in building for the risky commercial market.

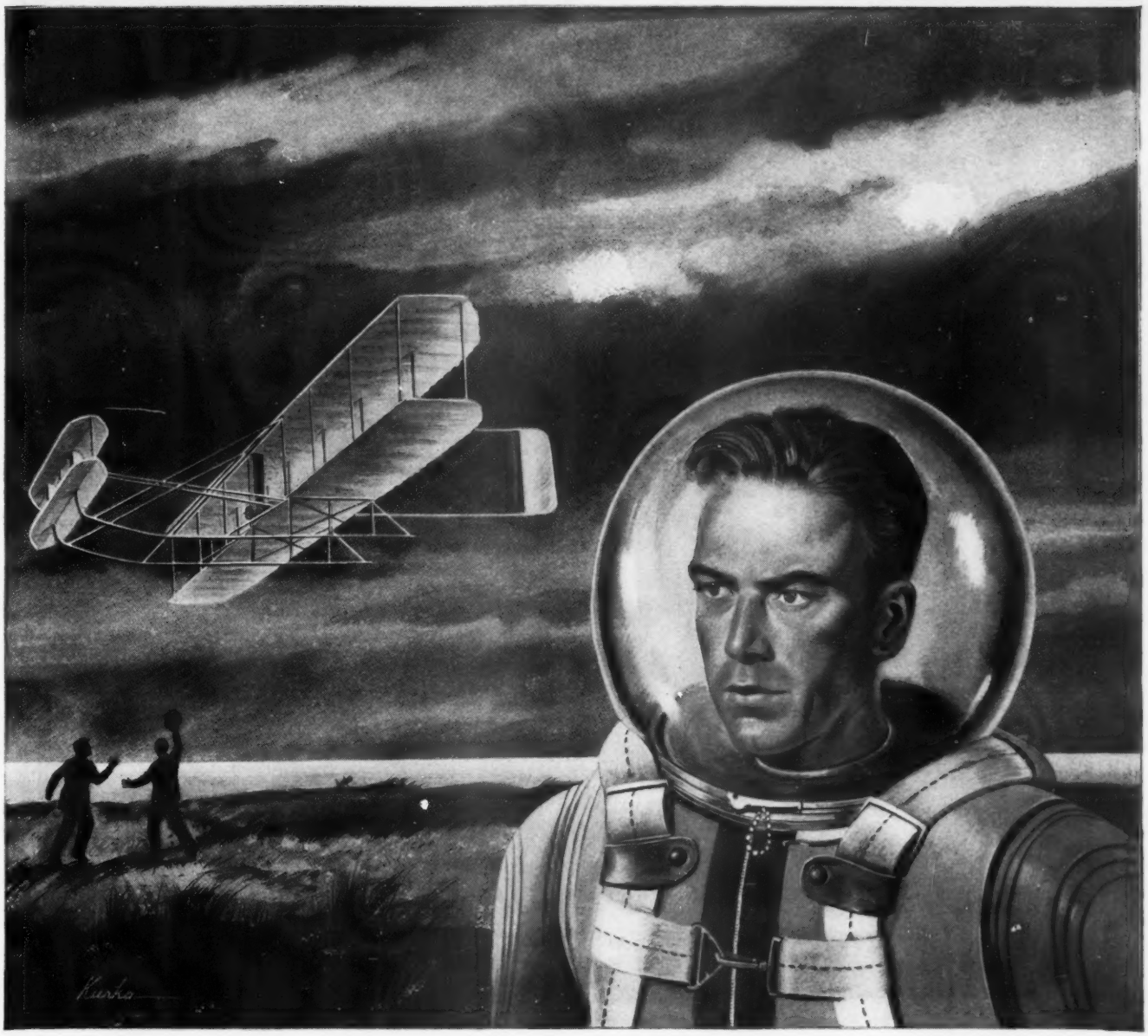
Development contracts are again being let on a cost-plus-fixed-fee basis. Though there is no uniform profit experience it is believed that earnings on such projects average about 3% on sales. Regular production contracts are generally on a fixed price basis and carry a higher profit margin.

The scramble for commercial business has been very costly for the aircraft builders. Lockheed, Douglas, Boeing, Convair and Martin have all had a very difficult time in developing new commercial transports and attempting to show a profit on their production. It is true, however, that the bulk of such development expense may have been absorbed by earnings realized during the war period. Nevertheless, no builder has as yet showed a profit on his commercial model.

Further, while Douglas and Lockheed may have passed through that initial painful period of introducing a new transport, the other builders have yet to go through the trials of receiving an approved type certificate from the CAA and to eliminate all the engineering "bugs" that are inevitable in a new plane. All this promises to be costly and time-consuming with an attendant heavy commitment in inventories. Moreover, in the light of current airline traffic trends, it appears that the market for new transports may have been greatly over-estimated and may require a longer period in which new transports can be sold.

▶ **Need For Military Orders**—The industry's background and very nature of operations today place it squarely on the mercies of military procurement. Assuming the creation of a special air policy board, it will nevertheless take considerable time for the agency to formulate its recommendations. It is reasonable to expect, however, that this board would advance constructive suggestions and would work a vast improvement over present practices being followed.

In the process, a sufficient volume of business to assure stable operations could be anticipated. By no stretch of the imagination would war level volume orders be necessary to assure profitable results. For the most part, the aircraft industry has no fixed charges to support and most properties and facilities are largely amortized, thus keeping current depreciation charges to a negligible amount. Once the volume of business is ascertained sufficiently in advance, production and operational schedules can be so adjusted to reduce many uneconomic practices to a minimum with the resultant decrease in overhead charges.



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TEMCO Seen as Major Factor In Personal Plane Field

Takes over bankrupt Globe's Swift after producing 300 under contract.

With other business already paying its overhead costs, and with engineering and tooling expenses already written off, the newest lightplane producer, Texas Engineering & Manufacturing Co., has the potentials, at least, of becoming a major factor in the personal aircraft industry.

The Dallas concern already has emerged full-grown in the lightplane industry. Its acquisition of the Swift from bankrupt Globe Aircraft Corp. brought it a product already on the market, and the company has the tooling and experience to produce it. It has a $6,000,000 annual volume outside anything the Swift may bring; 1,000,000 sq. ft. in a modern plant, and 2,000 employees.

▶ **TEMCO Hopes**—TEMCO's strength, and possibly chief hope of becoming a strong competitor in the lightplane field, lies in the business it had before it took over the Swift. It was formed about 18 months ago, shortly after VJ day, out of the cancellation of war contracts. Its president, Robert McCulloch, vice-president H. L. "Bert" Howard, and about 90 percent of the other employees worked for North American Aviation, Inc. in the same plant that the company now occupies. McCulloch was general manager and Howard comptroller, of NAA's Dallas division.

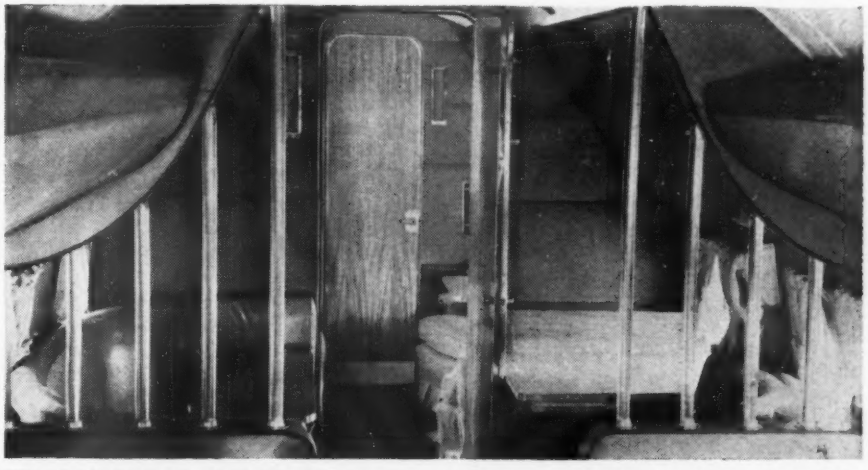
TEMCO began as a producer of commercial sheet metal products under contract, and this is still an important enterprise. It built several hundred Fairchild F-24s under contract, and entered the overhaul and conversion business, which is a sizeable part of its operation. Of the more than 1,000 Swifts shipped by Globe, TEMCO built more than 300, again under contract. Its first step as the prime producer of the lightplane was to cut the price more than $1,000, to $3,750 for the deluxe and $3,250 for the standard version.

▶ **Swift Bargain**—Having picked up the Swift off the bargain counter—with no heavy development expenses to be charged off against the airplane's selling price, TEMCO has a greater latitude in pricing than is generally true in the lightplane field.

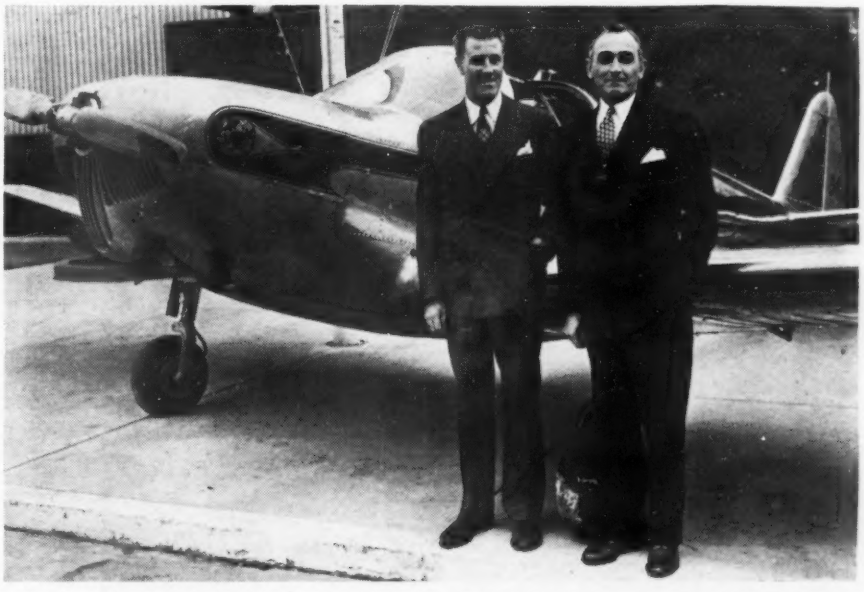
The company has converted more than 50 C-47s for airlines, and is a Douglas-licensed maintenance and overhaul center for C-54s. It has conversion work for TWA, Western Air Lines, Philippine Airlines and Avianca of Colombia. It is a major part of the American Republics program, under which the U. S. is rehabilitating the air forces of Latin American countries.

▶ **Overhaul Contracts** – For the ARP, TEMCO is overhauling more than 100 planes, including B-25 bombers, C-47 transports, OA-10s and BT-13s. It is also doing conversions for private operators.

It should have little worry over its production organization, built around former NAA personnel. These include Alvin Graff, general superintendent; C. A. Berthiame and O. A. Witbeck, superintendents; L. R. Childs, chief engineer; R. F. Yonash, chief project engineer; J. A. Maxwell, Jr., administrative assistant to the president; J. H. Baylis, director of personnel; C. D. Collier, purchasing agent; and J. C. McKelvain, chief inspector.



TEMCO'S BREAD AND BUTTER—Texas Engineering & Manufacturing Co.'s position in the lightplane field is strengthened by having an established conversion business which meets most of its overhead. Example of its work is shown in this photo of the club compartment of a C-47 converted as a personal transport for the president of a South American country.



NEW LIGHTPLANE MANUFACTURERS—Robert McCulloch, left, and H. L. "Bert" Howard, president and vice-president, respectively, of Texas Engineering & Manufacturing Co. which enters the lightplane field with the acquisition of the Swift from bankrupt Globe Aircraft Corp.

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ELECTRICAL AIRCRAFT WIRE

Northrop Preparing Pioneer for Tests

Northrop Aircraft, Inc., now making structural modifications of the prototype of its Pioneer, three-engine transport, will have the plane ready for sales demonstration tests within the next few weeks.

Principle modifications will be reconstruction of the tail surfaces from present "beaded" skin, externally stiffened, to standard smooth-skin structure with internal bracing—replacement of present split-type flaps by conventional "aileron-type" flaps—increase by 4.78 sq. ft. of the plane's wingtip "booster" ailerons. The latter change was ordered to give control sensitivity lacking previously at low landing speeds.

If the Pioneer goes into commercial production a further structural change will be made in the central fuselage area, changing the present cylindrical cross section to a modified rectangular area to gain more floor space and greater seating capacity as a feederliner. Northrop engineers consider that this modification will not alter the airplane's aerodynamic characteristics and will not be necessary in prototype demonstrations. Another minor change now being made is installation of a spring tab on the elevator to lighten control forces.

John W. Myers, Northrop vice-president in charge of sales, said the tail modification was indicated because Northrop engineering studies had disclosed that the smooth skin structure will have lower maintenance and repair costs. No changes are being made in the major structural components of the wing.

Props Here to Stay?

The propeller will remain the dominant means of transmitting propulsive power for aircraft of the future for all passenger and cargo flights conducted at speeds below that of sound. Such is the position of Hamilton-Standard Div. of United Aircraft Corp. as reported in the Beehive, company publication.

Below the speed of sound, propellers can be made more efficient than jets or rockets; and propellers, possibly augmented by jets, will power all passenger and all cargo carrying flights for years to come. This is true also of long-range bombers.

The conventional propeller is adaptable for use both with piston-driven engines and gas turbines. A gas turbine driving a propeller retains all the propulsive advantage of efficiency over the jet and rocket, and benefits at the same time by its simplicity and lower weight advantage over piston driven power units, the article contends.

Industry Observer

► Chance Vought's new fighter the XF7U-1 will be a tailless, sweptback wing version of the Pirate. (XF6U-1). Vertical fins will be carried on both wings.

► Entire De Havilland design staff is now concentrated on development of the DH 106 a high speed transport powered by four Ghost turbojets. Wing plan will follow roughly the sweepback of the ill-fated DH 108 in which Geoffrey De Havilland was killed last year.

► Shell Oil is developing a 130 octane aviation fuel that will be suitable for operations in weather as low as 50 degrees below zero.

► De Havilland has a $16,000,000 backlog of orders on the Dove, 8 to 11 passenger feederliner and $32,000,000 in Royal Navy orders for new verisons of the Hornet and Mosquito. Production rate on the Dove is now two per week with deliveries retarded because production on Gipsy Queen engines has not yet caught up with airframe production.

► First flight tests on the Percival Merganser feederliner indicated that so much has been added to the design weight that the payload now consists of "verbal messages." Plane will be redesigned in an effort to recover the lost payload.

► Stanley Hiller, Jr., is shooting for a September test flight on a new commercial helicopter that will be larger than his experimental commuter. The new 'copter will have a single rotor with a new seven-part simplified control assembly. Four models are now under construction.

► Convair has abandoned the designation Model 240 for its new transport and henceforth will plug it as the Convair-Liner. First NX model was originally scheduled for delivery to American Airlines but will be retained by the company to speed CAA licensing tests. Western will get the first NC plane.

► ATA president Emory Land disclosed that the United States Government spent $1,000,000 on the search for Amelia Earhart in the South Pacific.

► North American has launched a hiring campaign to add 1,600 production workers for a stepped up FJ-1 Navy program at its Inglewood plant and the AAF B-45 project at the former Douglas Long Beach plant.

► Southwest Airways, West Coast feederline, probably will be the first air carrier to conduct service tests on the new Allison 65 lb. airborne scope radar. Southwest has ordered a demonstration unit and if satisfied will place an order for 10 sets. Southwest has long been interested in practical application of a radar beacon airway as recommended in the Hinshaw Report (AVIATION WEEK, July 21).

► Solar Aircraft Co. has $700,000 in new orders for C-54 stainless steel manifold parts for Navy PB4Y-2 manifolds and sheet metal components for the Allison model 400 turbojet engine.

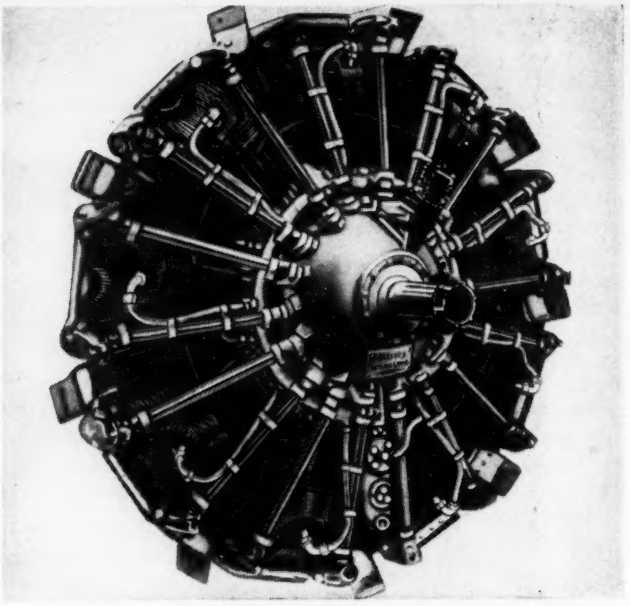
► Iraq Government is taking delivery on 30 British Hawker Fury fighters and four dual control fighter type trainers.

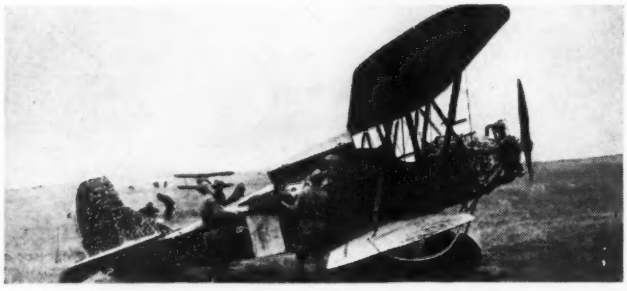
► Vought has reported a new compressibility problem on high-speed fighters: "snaking." This is a rapid directional oscillation of the airplane although not rapid enough to be classified as flutter. Snaking makes gunnery difficult because the swinging of the tail prevents holding sights on the target. Cause is peculiar airflow over the aft region of the XF6U-1 Pirate and other similar high-speed fighters. Snaking joins aileron "buzz" as two major new problems in transonic stability and control.

► North American's XB-45 nacelles solve a major problem presented by structural difficulties in installing a turbojet engine along the wing chord line, most efficient location. Although the engines lie below the wing, for structural reasons, NAA engineers located the air intakes high in the nacelle in line with the wing chord, thereby satisfying the requirements for minimum air intake nacelle drag.

► Sales promotion of Horace T. Pentecost's "Hoppi-Copter" (Seattle) is under way with display of a tripod landing gear model at the World Inventors Exposition in Los Angeles. R. W. Allen, Secretary of Hoppi-Copter, Inc., said that funds have been raised to complete development of what is expected to be a production unit, "Model 102." To date the testing of the model has been limited to brief low-level hovering flights within the ground cushion. No transitional flights have been attempted. Estimated performance calls for 96 mph. forward speed and 15,000 ft. ceiling. The model mounts a 35 hp. two-cycle engine, counter-rotating coaxial rotors of 16 ft. disc, and weighs 175 lbs. dry. Power to rotors is applied through a 10-to-1 gear box. The unit is expected to sell for under $1000.

► First airline service testing of Boeing's "Stratofreighter" is expected to coincide with the advent of the U. S.-Orient 25 cent airmail rate. Air Transport Command's C-97 is being prepared at Fairfield Air Base (Calif.) for flight to Honolulu. Timing of the first trans-ocean flight with issuance of the 25 cent stamp is because the stamp shows a C-97 flying over Golden Gate Bridge at San Francisco.





M-11F, 145-HP. radial developed from French Lorraine 5P, powers trainers such as U-2 and UT-2, which have been in service since before World War II. Larger versions of the M-5 have not been used extensively.

M-63, WITH TWO-SPEED supercharger is rated at 1,100-takeoff hp. Developed from American Wright R-1820 Cyclone, it powers PS-84 (Russian-built Douglas DC-3), GST (Russian built Convair PBY), and IL-2, shown here.

Evaluating Russian Aircraft Engines

By PAUL H. WILKINSON,

Editor, Aircraft Engines of the World

Genealogy and ratings of seven piston engines powering majority of Red Air Force trainers, fighters, bombers and transports.

Though considerable information has filtered through the Iron Curtain on Russian aircraft, very little engineering data has been disclosed on their power plants. Now, however, it is possible to see what these Russian engines look like, and to compare them with those of other nations.

Russian aircraft engines now in production have all been developed from well-proven power plants of American, French and German origin. They are of rugged design, with simplicity emphasized in their construction details, such as the use of poppet valves and gear-driven superchargers.

Seven basic types of reciprocating engines are taking care of the needs of the Red Air Force, with two additional types under development. Regarding jet engines, it is doubtful whether many jet engines have reached sizable production in Russia but when they do, undoubtedly they will be copies of German or British designs.

► **Trainer Types**—In the aircooled engine field in Russia, the smallest power plant is the M-5, a 5-cylinder radial of conventional design developed some years ago from the French Lorraine 5P (model 49). Earlier models of the series such as the M-11E were rated at 110 hp., and the M-11F now in production has a maximum output of 145 hp. These engines are used in primary training planes such as the U-2 and the UT-2. Larger versions of the M-5, such as the 7-cylinder M-21 rated at 220 hp. and the 9-cylinder M-31 rated at 320 hp., using the same cylinders and parts, have been built but have not been extensively used.

The M-63, the only 9-cylinder radial now in production, traces its development back through the M-62 and the M-25 to the American Wright R-1820 Cyclone. The M-63 has a 2-speed supercharger and is rated at 1,100 takeoff hp., while the M-62 which preceeded it is rated at 1,000 hp. These two engines are used in advance training planes such as the I-15-3, and in 2-engine transport planes such as the PS-84 (Douglas DC-3) and the LI-2 of similar design. The M-62 is also used in 2-engine flying boats such as the MDR-6 (Douglas Dolphin) and the GST (Consolidated PBY Catalina).

The M-82 is a relatively new 14-cylinder radial which reached the production stage toward the end of World War II as a countermeasure to the German BMW 801. Developed from the American Wright R-2600 Cyclone and equipped with a 2-speed supercharger, the M-82FNW is rated at 1,850 hp. at takeoff, comparing quite favorably with the 1,900 hp. output of its American prototype. This Russian engine has direct fuel injection using a 14-plunger barrel type injection pump of German Deckel design. Other models of the series such as the M-82-111 and the M-82-212 are equipped with downdraft carburetors.

THE Swift IS HERE TO STAY!

A Statement by Texas Engineering & Manufacturing Co. .... New Manufacturers of the Famous All-Metal Swift

THE GLOBE SWIFT has been acclaimed one of the nation's few truly "post-war" personal aircraft. It combines advanced performance with exceptional utility and flying ease. Many pilots call the Swift the finest airplane in the two-place field. More than 1,200 Swifts now flying in North and South America, Africa, and Europe have won international recognition for splendid cross-country performance. Texas Engineering & Manufacturing Co., Inc., is proud to announce the purchase of patent and manufacturing rights on the Swift from the Bankrupt Globe Aircraft Corporation along with tools, raw materials, supplies and sub-assemblies. Temco's full resources are now behind continued Swift production and servicing. We assure all Swift owners, dealers, and prospective customers that the Swift is in the field to stay.

Financial Strength, Manufacturing Experience

Temco is one of the Southwest's major post-war industrial firms. Gross sales in 1946 totaled more than $5,000,000.00 with more than $6,000,000.00 gross business scheduled for the current year. Temco is operated by former executives of North American Aviation in 1,000,000 square feet of the former N.A.A. plant near Dallas. Almost 2,000 skilled workers are employed in the air-conditioned plant and about 90% of them are experienced former North American Aviation employees. Temco's many different manufacturing activities help guarantee stability and security for both dealers and customers. Production of the Swift is not new to Temco, as 330 Swifts were produced on contract for Globe Aircraft Corporation, and 40% of the component parts for all Globe Swifts were Temco made.

A CAA Certified Operation— The Civil Aeronautics Administration has certified Temco as an aircraft manufacturer, conversion, and modification plant. Contracts are now in the shop for the U. S. Army Air Forces, and several domestic and foreign airlines, Fairchild Airplane Co., and for non-aviation commercial products. Temco has plenty of plant and plenty of "know how" to build real aircraft quality into the new Swifts.

Swift Prices Go Down!

Now you can get your new DeLuxe Swift for $3,750, or the Standard Swift at $3,250. Temco plans to build sales by keeping prices in line with competition and by giving you the most airplane per dollar.

Both models are ready for immediate delivery.

How can we reduce prices now? More than $2,000,000 were invested by the now dissolved Globe Aircraft Corporation in developing the Swift to its present state of perfection. With these heavy expenses already taken care of, Temco can produce the Swift at lower cost. These savings are passed along to you in the form of an even better Swift at a lower price.

Two important improvements on the new Temco Swifts are the Steerable Tail Wheel and (on the DeLuxe only) a Metal Top Canopy.

Service and Parts Are Available

Plenty of genuine Swift parts are in stock now. Parts and Service are offered through established dealers with factory service offered where dealer service is not available. Nation-wide Sales and Service organization is now being set up. Write for the name of nearest Dealer.

The Swift is the only airplane in its class approved by the Veterans Adm. as a secondary trainer for G. I. flight schools.

The Swift

To Swift Owners—So that you may be registered as a Swift owner to receive new Service Bulletins and other valuable information, you are invited to write immediately to Owner Service Department giving your name, address and the N. C. and manufacturer's Serial Number of your Swift.

TEXAS ENGINEERING & MANUFACTURING CO., Inc.

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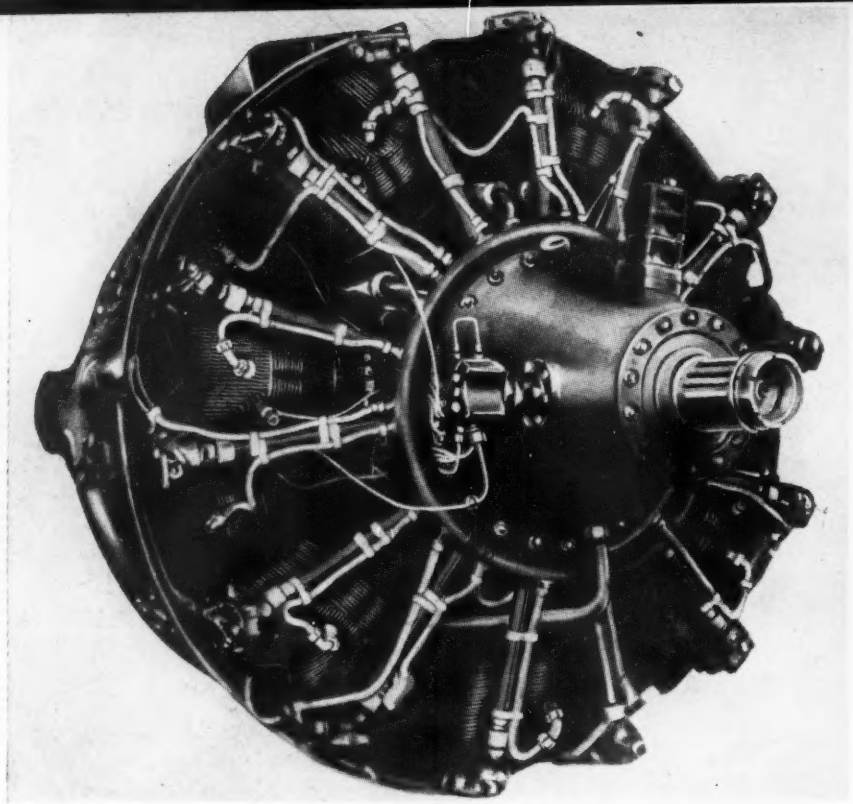
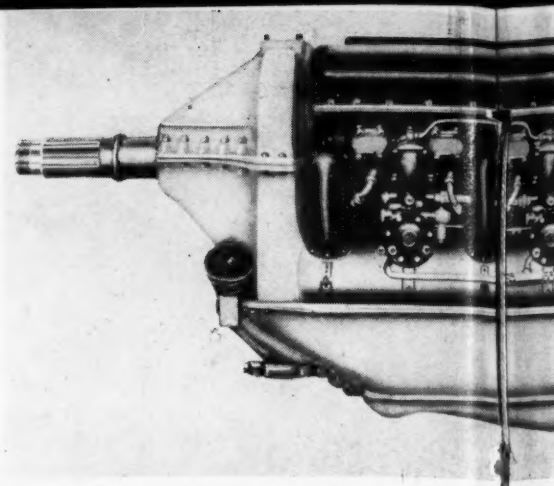
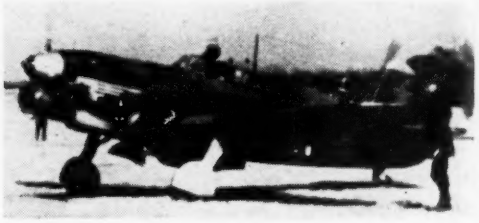




M-107A, WITH FOUR VALVES per cylinder an impr
5,600 ft. Used in YAK-9 and -11 fighters and oth s now



M-82 FNW of 1,850 hp. was developed from Wright R-2600. Powers LA-5 and YAK-7 (illustrated) fighters, IL-4 and TU-2 bombers and TB-7 four engine bomber-transport.

The M-82FNW is used is some of the latest Russian fighters such as the LA-5 and -7, and the YAK-7. It is also used in such bombers as the 2-engine IL-4 and TU-2, and the 4-engine TB-7 (PE-8). Transport planes powered with it include the 2-engine IL-12, is a larger version of the LI-2 of Douglas DC-3 origin.

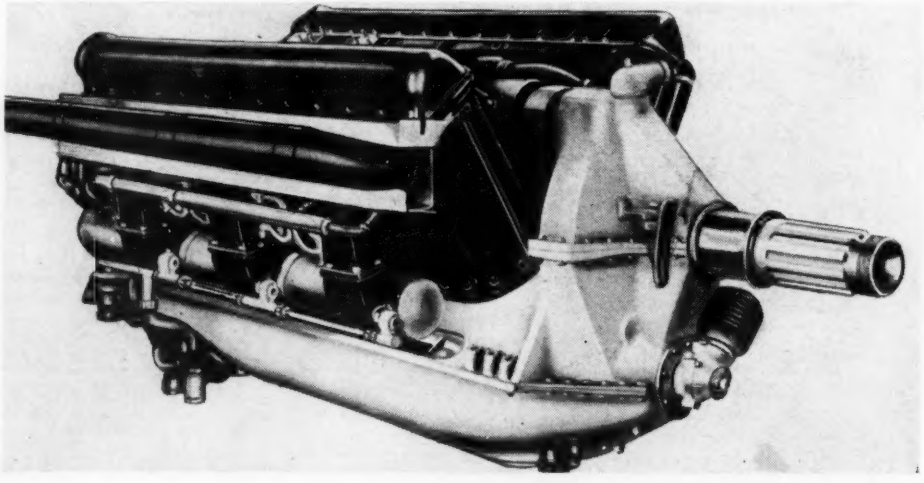
► **French Ancestry**—The M-88 is a 14-cylinder radial of French origin with its ancestry going back through the M-87, M-86 and M-85 to the Gnome-Rhone 14N. Rated at 1,100 hp. at takeoff and equipped with a 2-speed supercharger and an updraft carburetor, the M-88B is used in IL-4 (DB-3F) and the SU-2 twin engine bombers. A later model known as the M-89 equipped with direct fuel injection and rated at 1,300 takeoff hp. and 1,140 hp. at 19,700 ft., is used in the most recent model of the SU-2 bomber. It also powers the new IL-18 4-engine transport which bears considerable resemblance to the Douglas DC-4.

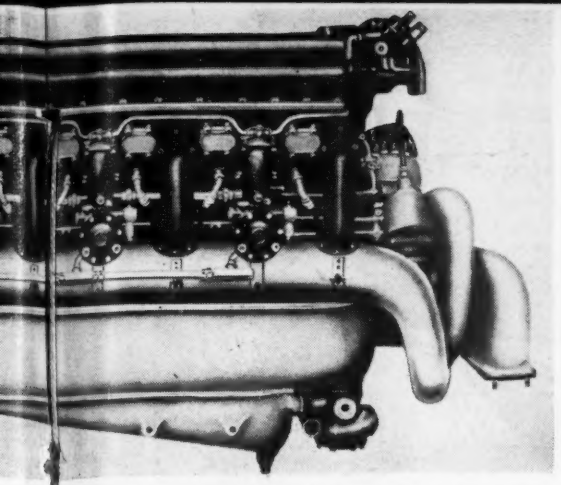
An 18-cylinder aircooled radial similar to the American Wright R-3350 is under development for use in Russian copies of the Boeing B-29. It may be equipped with direct fuel injection.

In the liquidcooled engine field, Russia has concentrated most of its efforts on conventional 12-cylinder vee-type powerplants based on French, American and German designs. Most extensively used of this type is the 12-cylinder M-105 which can be traced back through the earlier M-103 and M-100 to the French Hispano-Suiza 12Y. Several models of the M-105 are in production. The M-105P and the M-105PA are rated at 1,100 hp. at takeoff and have provision for a cannon or shell gun firing through the hollow propeller shaft. The M-105PF is similar to the M-105P but has a rating of 1,260 hp. at 2,600 ft. for low-altitude operation in ground attack planes. The M-105PD is similar to the M-105P, but has a 2-stage supercharger with hydraulic coupling and is rated at 1,055 hp. at 21,000 ft. The supercharger equipment on the M-105PD is similar to the 2-stage installation on the Allison V-1710-E30 used in Bell Kingcobra fighters supplied by America to Russia during World War II. The M-105R is similar to the M-105P but has no provision for a cannon.

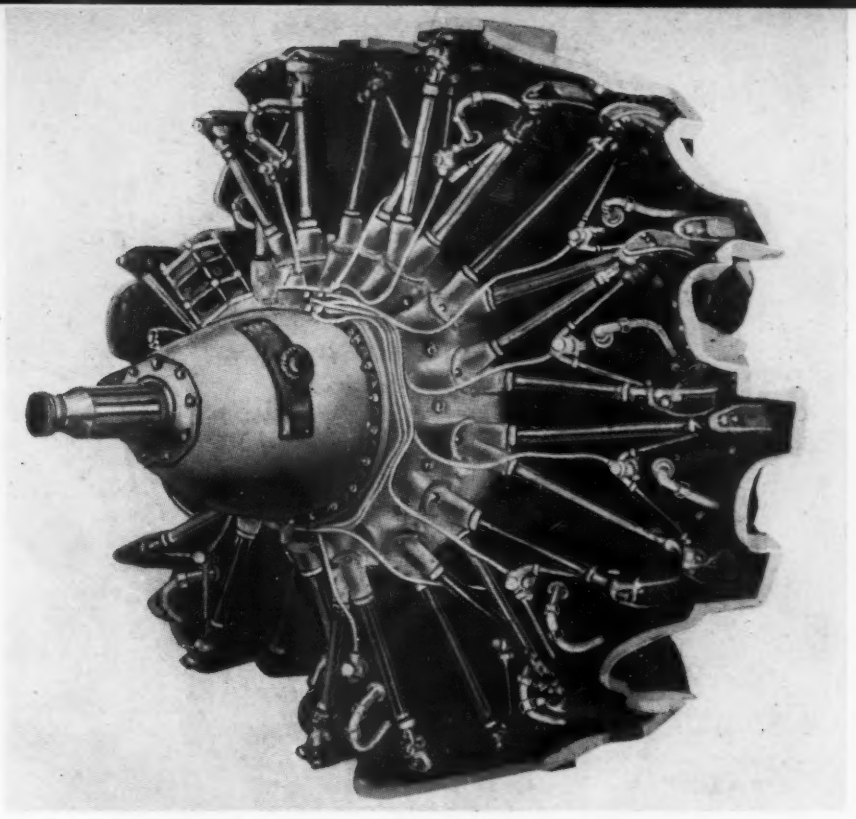
► **Fighter Engines**—The M-105P with a 20-mm. cannon is used in fighters such as

M-105P IS descendant of French Hispano-Suiza family. Delivers 1,100 hp. at takeoff. Mounted in LAGG-3 and YAK-1 ground attack planes, with cannon firing through hollow propeller shaft. Also used in PE-2 shown here.





ler an improved supercharging delivers 1,600 hp. up to
d oth s now in production for Red Air Force.



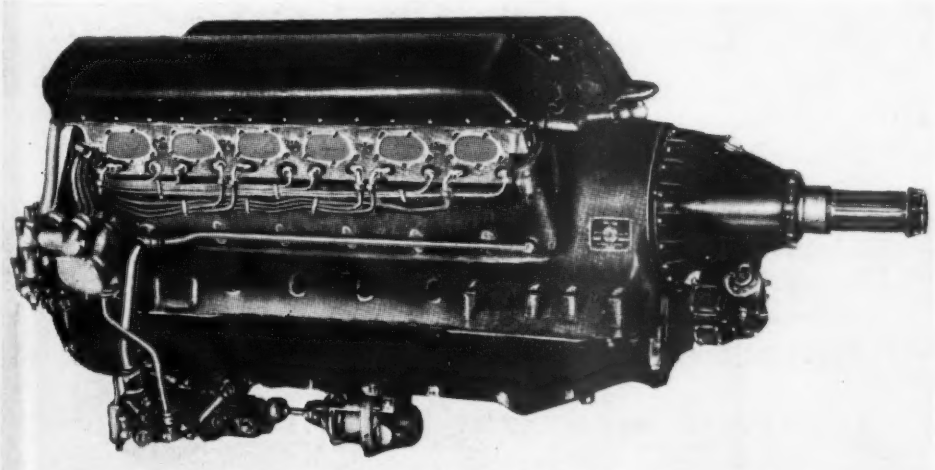
M-88B, 14-CYLINDER radia is rated at 1,100 hp. and is descendant of French Gnome-Rhone 14. Used in IL-4 as shown, and SU-2 twin enigne bombers.

the LAGG-3 and the YAK-1, and the low-altitude M-105PF is used in ground attack planes such as the YAK-1B, the YAK-9T "tankbuster" equipped with a 37-mm cannon, and the 2-engine PE-2. This latter engine is also used in the YAK-7B advance trainer. The M-105R, without cannon, powers the AR-2 (SB-RK), ER-2 and YAK-4 twin engine attack bombers.

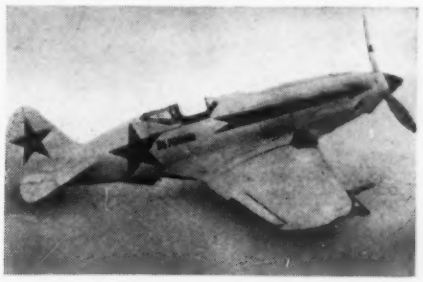
A further development of the M-105 is to be found in the new M-107 engine which, although of the same displacement and basic design, is credited with a takeoff power output of 1,600 hp., which is maintained to 5,600 ft. This is made possible by the use of four valves per cylinder instead of three, improved supercharging and other modifications copied from the more recent Hispano-Suiza 12Z. The M-107A is used in YAK-9D and YAK-11 fighters, and in other new aircraft now in production for the Red Air Force.

The AM-38, largest liquidcooled gasoline aircraft engine produced in Russia, owes its origin some 15 yr. ago to the American Curtiss Conqueror and the German BMW VI (also manufactured in Russia under the number M-17). Although the American and the German engines were of considerably smaller displacement, many of their basic features were embodied in the M-34—forerunner of the AM-35 and the AM-38—when it was exhibited at the Paris Aero Show in 1934. The AM-38A, rated at 1,600 hp. and the AM-38F which has a maximum rating of 1,700 hp., still have four carburetors between the cylinder blocks as originally used on the Curtiss Conqueror. The AM-35A, a somewhat earlier model, is rated at 1,350 takeoff hp. and 1,200 at 19,700 ft. using a single-speed supercharger having a ratio of 14.6:1. The AM-35A is used in fighters such as the MIG-3, and in 4-engine bombers such as the TB-7 (PE-8). The AM-38A powers the latest model of the IL-2 "Stormovik" armored ground attack plane.

▶ **Diesel Engine**—Another Red engine under development is of particular interest as it is for the most part of Russian design—and is a Diesel. Known as the M-40, this 12-cylinder upright vee liquid cooled powerplant of 3,800 cu. in. displacement went into small scale production in 1941. The M-40F model is rated at 1,500 hp. for takeoff and 1,250 hp. at 19,700 ft.



AM-38F, WITH TOP RATING of 1,700 hp. is reported most powerful liquid cooled engine now in production in Russia. Developed from Curtiss Conqueror and BMW-VI, if powers MIG-3 (shown), latest IL-2 Stormovik and TB-7. (Engine photos copyright, 1947 by Paul H. Wilkinson)



Neglecting preflight procedure is one sure way to keep your plane from growing old. A less hazardous method is the proper finishing of aircraft. Murphy formulations for finishing, refinishing, and maintenance are designed to help keep planes youthfully trim. You'll find them at airports and refinishing shops the country over or write: Interchemical Corporation, Finishes Division, 350 Fifth Avenue, New York 1, N. Y.

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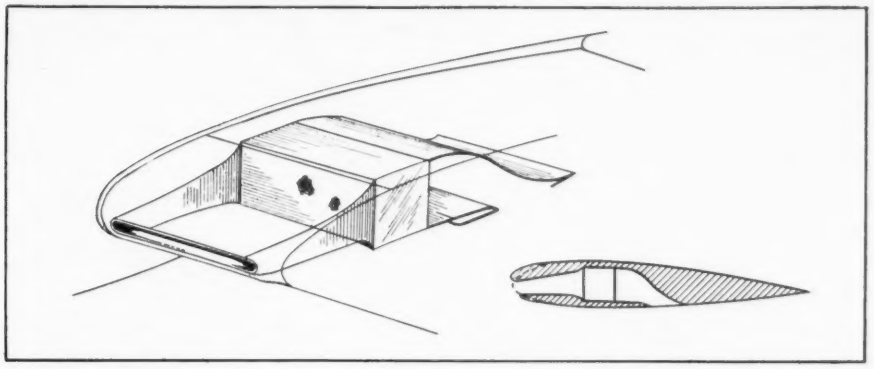
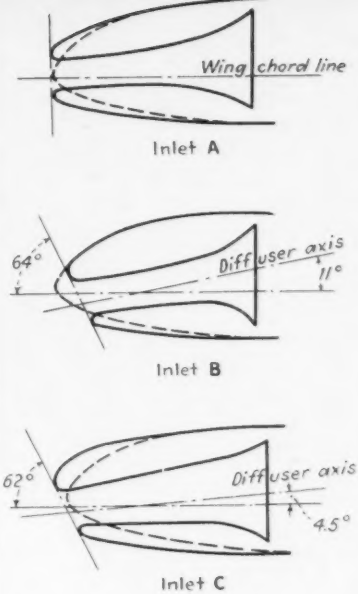
Searching Drag Studies Check Speed Impeders

Part III

To determine undesirable aerodynamic characteristics, exhaustive drag investigations on various military craft were conducted in the Langley full-scale wind tunnel of the National Advisory Committee for Aeronautics. Data obtained is presented here in the form of sketches showing original installations together with modifications studied, and a discussion of the main results of the tests made. Parts I and II, detailing cowling drag factors, appeared in May and June *Aviation*. We continue the analysis here with results obtained from investigations of ducting installations.





Inlet	C_L	ΔC_D	Q/V_o	$H-p_o$
A	0.12 0.89	0.0006	0.56	$0.95q_o$ $0.22q_o$
B	0.12 0.89	0.0022	0.56	$0.86q_o$ $0.87q_o$
C	0.12 0.89	0.0011 (Estimated)	0.56 (Estimated)	$0.95q_o$ $0.68q_o$

C_L - *Lift coefficient*

ΔC_D - *Drag coefficient increment*

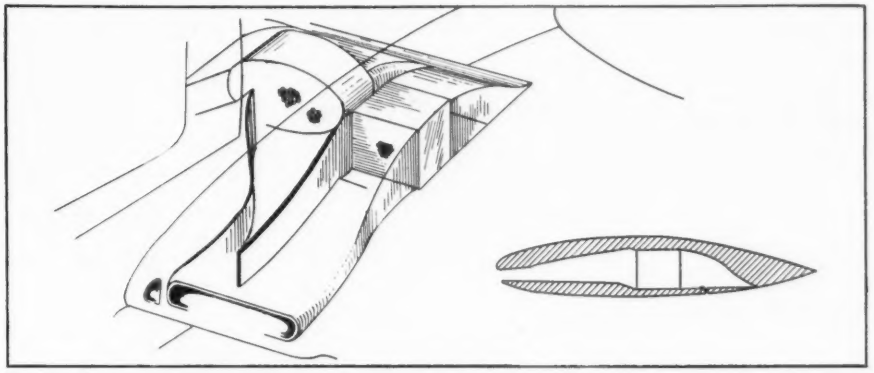
Q - *Quantity rate of flow, cu.ft. per sec.*

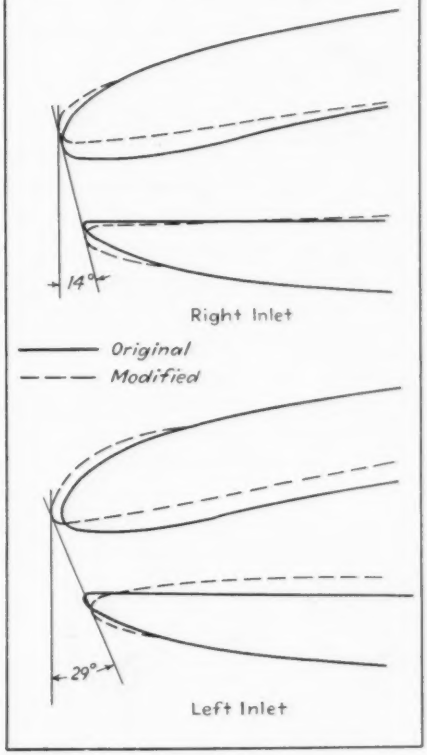
V_o - *Free stream velocity, fps.*

H - *Total pressure, lb. per sq. ft.*

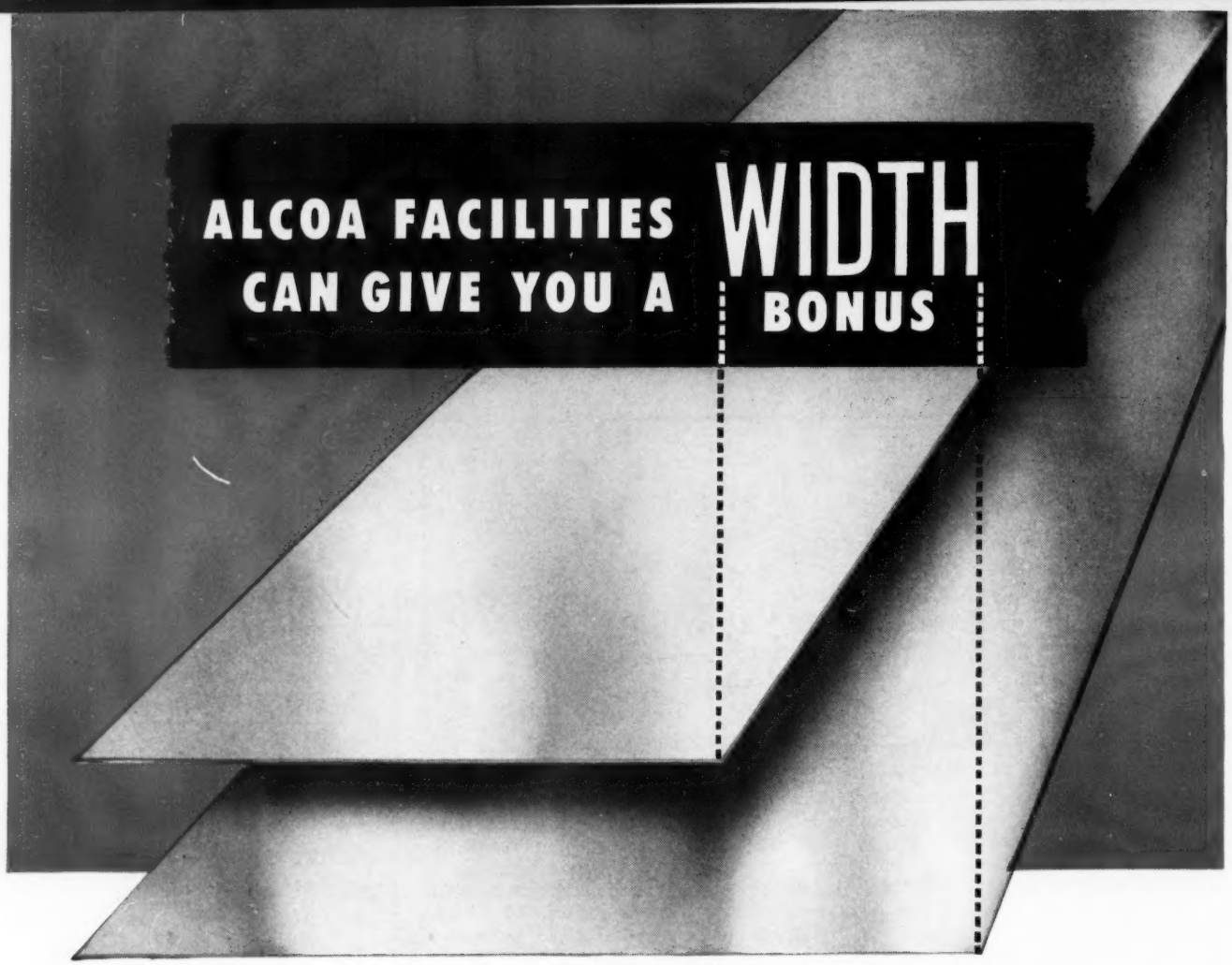
p_o - *Free stream static pressure, lb. per sq. ft.*

DRAG DECREASED WITH MODIFIED INLETS. General arrangement of original wing duct installation is seen above, and representative inlet shapes tested for craft are shown at right, top. Small sharp-lip inlet (A) with inlet plane perpendicular to wing chord and diffuser axis parallel to chord, showed lowest drag at low lift coefficients. At high lift coefficients, internal flow separated from lower lip and resulted in pressure recovery loss at radiator face. Inlet (B) was designed to obtain higher pressure recoveries at high lift coefficients, but at low lift coefficients pressure recovery was less than for inlet (A) because separation occurred just inside upper lip. No separation occurred at high lift coefficients and pressure recovery was higher with inlet (B) than with (A). Drag of inlet (B) was highest of those tested. Compromise inlet (C) was found most satisfactory in light of high pressure recovery and low drag for wide range of flight conditions. When inlet lips are extended (C), design should be executed with due regard to external shape. Since no drag data were available for inlet (C) at $Q/V_o = 0.56$, drag increment shown was estimated from available data at $Q/V_o = 0.70$.





RESULTS ON OTHER CRAFT showed drag coefficient increment of 0.0013 when seals were removed from wing duct inlets and exits with exit flaps at 0 deg. for high speed condition. Removal of seals from holes for flap-control push rods in top of duct exits added increment of 0.0004, giving total drag coefficient of 0.0017 for original installation, with large quantity of air flowing through duct because of leakage at exit flap. Tests with propeller operating showed serious losses in total pressure recovery as result of misalignment of duct lips to airstream caused by slipstream rotation. To remedy condition, modified inlets (represented by dash lines in sketch at right) were installed with plane of inlet on side of upgoing propeller blade tilted 15 deg. farther downward than plane of inlet on side of downgoing blade. Further modification consisting of increase in areas of left and right inlets from 55 to 73 sq. in. was made to lower inlet velocity ratio. For high speed condition, with exit flaps at 0 deg., modified inlets decreased drag coefficient 0.0005 and increased total pressure 15% at faces of radiators. Cooling was improved for both high speed and climb conditions with modified inlets.



In all-metal aircraft construction, an extra wide sheet can often mean a saving in weight, a production economy, and a surface that is aerodynamically cleaner.

Alcoa's facilities for producing these extra-wide sheets have aided in the development of "sandwich" materials, from wide, thin Alcoa Aluminum Sheet. In the heavier thicknesses, these wide sheets can eliminate laps and attendant rivets in aircraft of the commercial size. The very heavy thicknesses are employed in the highly-stressed skin structures of large or high-speed military aircraft, where a fair surface and elimination of lap weight are of critical importance.

Alcoa facilities like this are the result of years of close co-operation with the aircraft industry, and our policy of working unceasingly to increase aluminum's usefulness. ALUMINUM COMPANY OF AMERICA, 2182 Gulf Building, Pittsburgh 19, Pa. Sales offices in principal cities.

Standard .016 Sheet Maximum Width	36″
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ALCOA MAXIMUM	60″
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ALCOA MAXIMUM	72″

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ALCOA FIRST IN ALUMINUM

IN EVERY COMMERCIAL FORM

Boeing Develops Baby Turbojet

150-lb. unit adaptable as auxiliary aircraft power plant or for surface use; companion turboprop seen available for advanced lightplane designs.

Boeing Aircraft Company has taken the wraps off its midget turbine powerplant project to disclose:

- A two-burner turboprop engine weighing 140 lb. and delivering 200 shaft horsepower with an added 50 lb. thrust from exhaust;
- A two-burner turbojet engine weighing 85 lb. and delivering 150 lb. static thrust.

These are the engines AVIATION NEWS announced to the aircraft industry June 23 and said would be "about the size of a portable sewing machine."

While Boeing engineers anticipate that the turboprop (Model 502) may easily revolutionize the personal airplane engine market, and prod airplane designers into developing pressurized light planes for high and fast turbine-powered flight, officially the company is more conservative.

▶ **Immediate Uses**—The company admits that the turboprop model "appears suited for use in small airplanes as the prime power source," but quickly cites other and probably more immediate uses: auxiliary power in large aircraft; target plane power; boat propulsion; automobile power; stationary power plants.

For its smaller (Model 500) turbojet, Boeing sees immediate use as a starter engine for larger jet engines and as a propulsion unit for missiles, glide bombs and small airplanes.

At Seattle, Harold Mansfield, Boeing director of public relations, told AVIATION WEEK that because the engines still are under experimental testing no conclusive information can be given on their fuel consumption.

To date the Model 500 prototype has had 100 hr. of running time, while component testing has gone well over 1,000 hr. Although normal operating speed is 36,000 rpm. no serious design problems have appeared during tests.

Minus tail pipe, the turbojet has a length of only 29 in. and a maximum diameter of 22 in. A 7.25-in. turbine wheel and centrifugal compressor are connected to a common shaft. Burner temperature is given as 1,500 deg. F.

Only slightly larger is the Model 502 engine, which has a length of 42 in. but no increase over the Model 500 in maximum diameter.

▶ **Production Possibilities**—While the two gas turbines are reported by Boeing officials to have been developed primarily as research projects, to gain turbine power plant knowledge at nominal cost, it now is quite apparent that the Seattle airframe builder may well become an engine manufacturer.

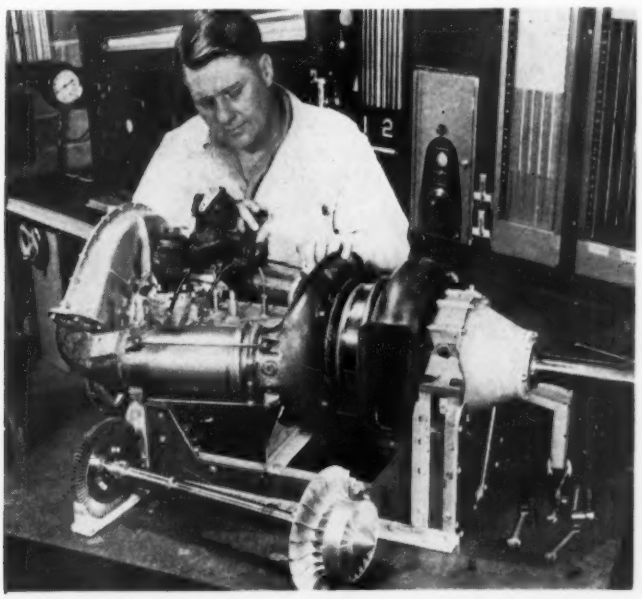
As might be expected, Boeing will look to the armed services for its initial engine market, and additional turboprop engines of the Model 502 design will be built immediately for military testing.

BOEING'S FLEAWEIGHT TURBOJET

Boeing Model 500 turbojet, which develops 150 lb. thrust for weight of 85 lb. Companion unit, Model 502 turboprop, delivers 200 shp. and 50 lb. thrust for weight of 140 lb. Both are by-products of research done as first step in designing jet-powered aircraft, and when studies of individual components looked promising, company decided to build actual units for further evaluation. One result is that Boeing is now building additional experimental engines for military services. Model 500 is 29 in. long, 22 in. at max. diameter and has 7¼-in. turbine. Model 502, basically same engine except for additional turbine to drive propeller shaft through gear box, is 42 in. long.

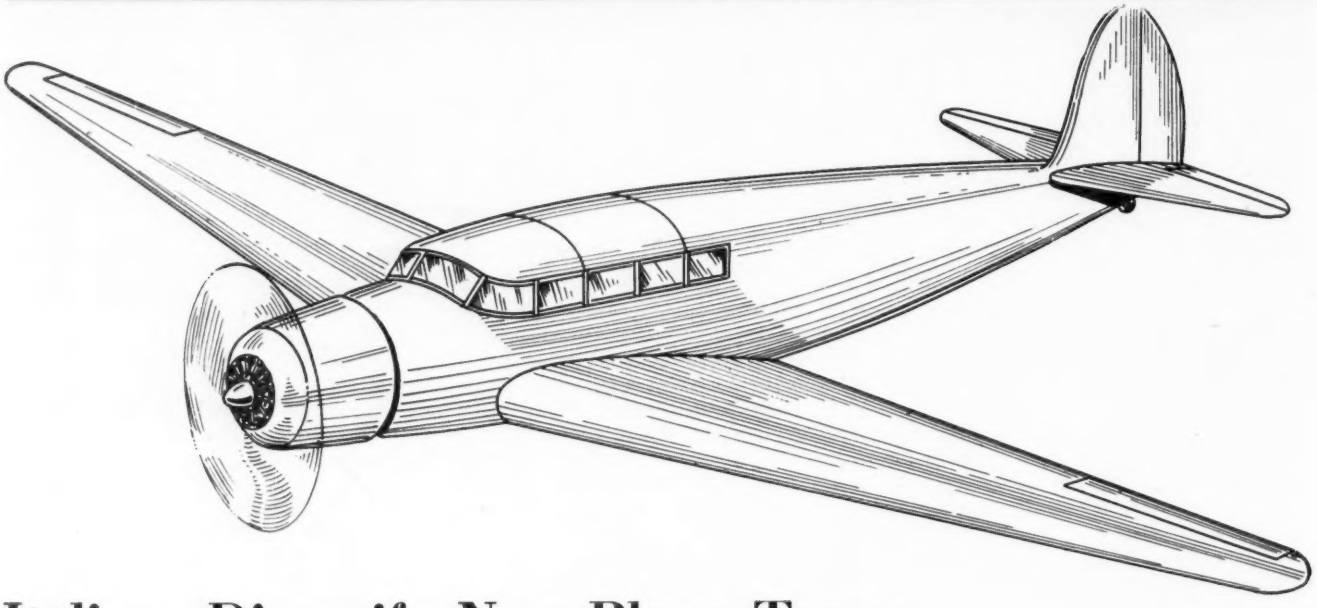
Conceivably the military services might order the baby turbojet in mass quantities as engine starters having less weight and greater simplicity than electric starting systems now in use on U. S. prime mover turbojets.

COMPRESSOR AND TURBINE of Boeing Aircraft Model 500 turbojet which develops 150 lb. static sea level thrust for weight of 85 lb. Though reportedly built solely to gain research information, unit is seen readily available as auxiliary power plant for large aircraft.



BOEING MODEL 502 TURBOPROP, delivering 200 shp. and 50 lb. thrust with weight of but 140 lb. Basically similar to Model 500, its maximum diameter is 29 in. Compressor-turbine speed of both units is 36,000 rpm. and burner temperature is reported at 1,500 deg.

NEW AIRCRAFT



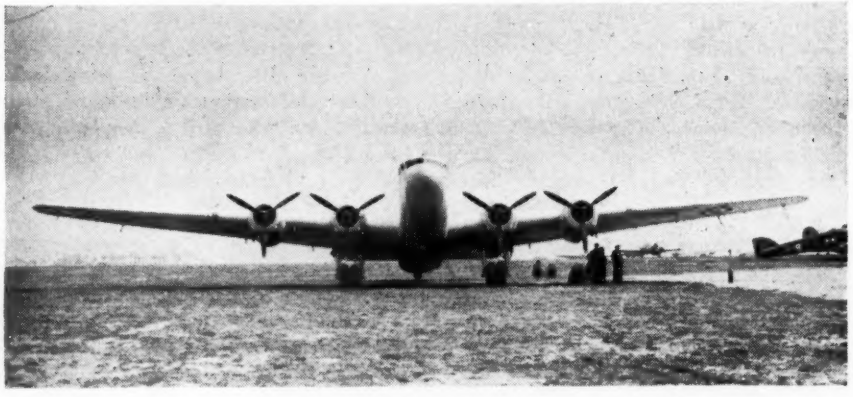
Italians Diversify New Plane Types

Siai-Marchetti completing personal-charter prototype; running flight tests on four-engine 18-passenger-cargo liner.

Now under construction in Italy is the prototype Siai-Marchetti SM-101 (artist's conception of which is shown above), an all-metal craft designed for charter or personal flying.

Of conventional low wing construction, it seats pilot and five passengers. Design gross weight is reported at approximately 4,800 lb., of which 1,900 is given as useful load. For short takeoffs, wing area is 321 sq. ft., with span set at 53 ft. 8 in., length 33 ft., and height 9 ft. 10 in.

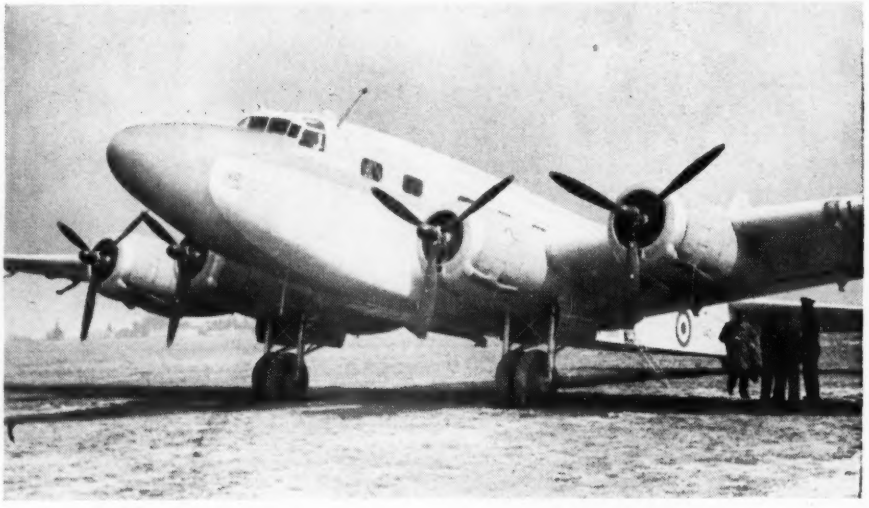
Powered by a 235-hp. Walter Bora engine, cruising speed at 70% of power is expected to be 140 mph. If the goal of keeping fuel consumption to .38 lb. per hp. hr. is achieved, the craft will use about .64 lb. per mi.



▶ **Four Engine Transport**—Currently undergoing test flights is the four engine Siai-Marchetti SM-95, (below) which appears to be a normal development of prewar Savoia-Marchetti types. Designed for a crew of two, 18 passengers and 1,400 lb. of baggage and cargo, it is powered by 930-hp. Alfa 128-RC-18 aircooled radials giving cruising speed of 185 mph. at 70% power. It is reported to have made 2,000-mi. flights with fuel consumption of 5.2 lb. per mi.

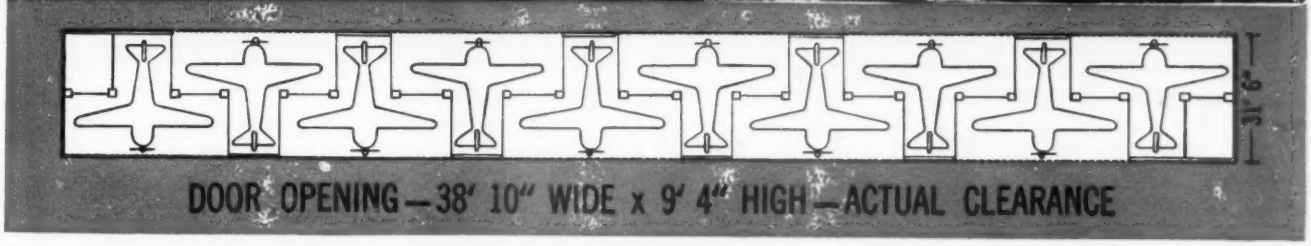
Span is 111 ft., length is 72 ft., height, 18 ft. 6 in., and wing area is 1,380 sq. ft.

Of all-metal construction, the craft features slotted flaps. Cargo compartments are provided both fore and aft of the wing below the passenger compartment.



Immediate Delivery

BUTLER BUILT
RADIAL HANGARS



NEW LOW PRICES

Stepped up production pays off! Butler's fire-safe tamper-proof Radial Hangars are now available for immediate delivery in single or multiple units—at new low prices.

For one to ten planes, or more, they afford each its own lock and key privacy—isolated by four walls from rough and indiscriminate handling. The Up-Over-and-Under door raises freely by hand, rolls out of sight under radial roof . . . makes for quick, easy entry into hangar. Front corner space at each end of single or multiple unit is well daylighted for club or office quarters or for shop and parts storage.

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Fire-safe, weather-tight, tamper-proof, Butler TRR Hangars easily erected, provide complete safe housing for small planes at low cost. They are structurally strong . . . aerodynamically shaped to decrease wind pressure and snow load. Non-swinging doors provide 41'8" x 9' clearance. Immediate delivery.

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☐ Multiple Unit for_____Planes. ☐ Single Unit. ☐ TRR Hangars.

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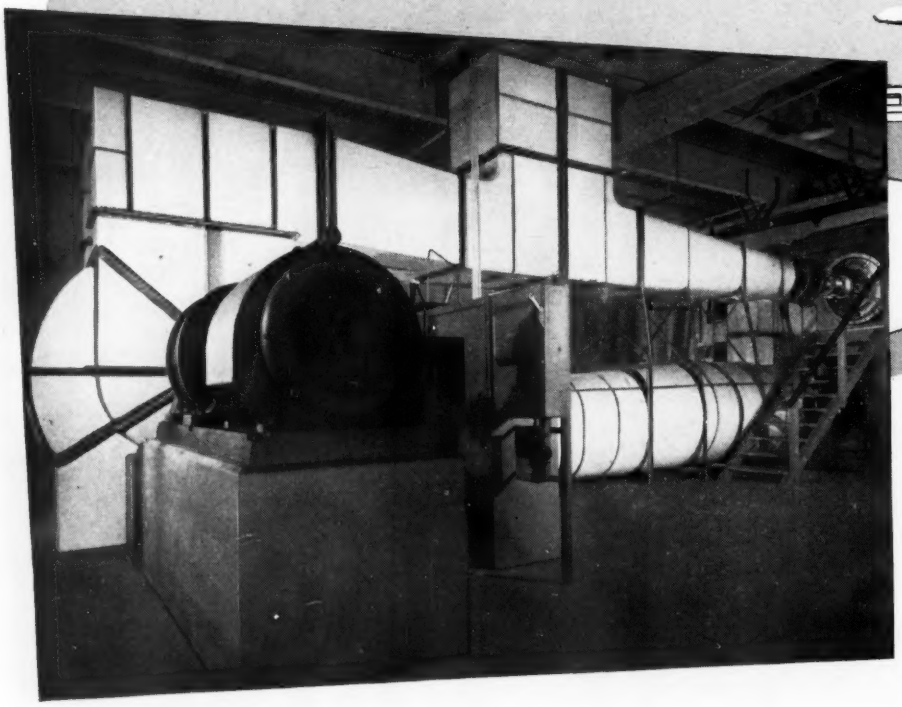
Oil Cooler Efficiency Here...



Is Accurately Predicted Here

View of Clifford's Wind Tunnel Laboratory showing the hot tunnel section which tests oil cooler performance at sea level conditions.

Ability of "Feather-Weight" All-Aluminum Oil Coolers to perform under any temperature or atmospheric conditions likely to be met in service can now be precisely predetermined.

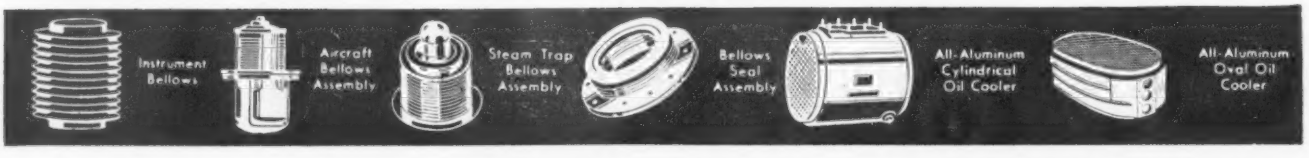
In Clifford's wind tunnel laboratory... largest and most complete in the aeronautical heat exchanger industry... operating conditions from sea level to 50,000 feet can be accurately predicted. This permits close fit of coolers to individual specification.

Inquiries concerning "Feather-Weight" Oil Coolers are invited. Clifford Manufacturing Company, 561 East First Street, Boston 27, Mass. Offices in Chicago, Detroit and Los Angeles.

CLIFFORD *Feather Weight* **ALL-ALUMINUM OIL COOLERS**

HYDRAULICALLY-FORMED BELLOWS

HYDRON Metal Bellows



New British Sprite Has Noise Mufflers

(McGraw-Hill World News)

London—A personal plane with a noise-level of a private car is the objective of Essex Aero Ltd., in developing the Sprite, their first complete airplane.

The company, which has previously made only aircraft sub-assemblies and light alloy structures such as fuel and oil tanks, has designed a two-seater side-by-side personal plane of monocoque, stressed-skin construction with all parts except the control surfaces of magnesium alloy with welded joints throughout.

The plane, first British design to use the butterfly tail introduced by Beech in the Bonanza, is also the first to be announced as using the new Nuffield aircraft engine, a 4-cylinder air-cooled 100-hp. unit. The noise-level is to be kept low by incorporating the engine mounting with the cowling, by using a patented silent reduction-gearing for the propeller drive, and by a special "tuned" silencing system introduced into the exhaust.

A two-bladed prop is to be fitted initially, but a multi-bladed one will be used later, when available, further to improve quietness.

The Sprite, which is expected to make its first flight in the fall, will be available in two versions, one with fixed tricycle undercarriage and one with retractable gear. Passenger safety features include a stout crash arch built into the Perspex cabin roof that gives exceptionally good visibility, and a seat harness, which permits unrestricted movement by the two passengers yet can be quickly locked when required.

Specifications follow:

Dimensions: Span, 30 ft.; Length, 24 ft. 7 in.; Height, 7 ft. 10 in.

Weights:

	Wigh Fixed Landing Gear	With Retractable Gear
Tare wt.	879 lb.	921 lb.
Disposable load	669 lb.	669 lb.
Maximum gross wt. (with 25 gal. fuel)	1584 lb.	1590 lb.
Performance expected:		
Maximum speed	141.5 mph.	149 mph.
Cruising speed (@ 70 hp.)	121 mph.	128.5 mph.
Stalling speed (flaps down)	43 mph.	43.8 mph.
Initial rate of climb	760 ft. per min.	744 ft. per min.
Range, normal load (10 gal.) (1.5 hr.)	290 miles	305 miles
Range, maximum load (25 gal.) (5.1 hr.)	760 miles	790 miles

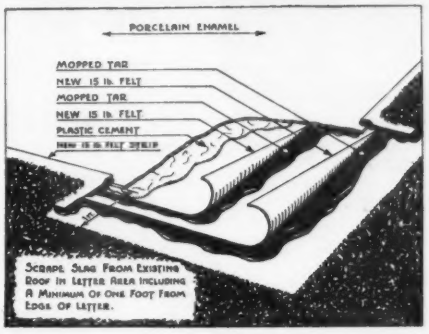
Reduce Drill Work

Possibilities of considerable savings in aircraft manufacturing tooling and production manhour costs through reductions in the number of drilled hole sizes are seen in a new table issued by the American Standards Association. Titled: "Limits and Fits for Engineering and Manufacturing," the new standard specifies a total of 46 preferred hole sizes covering the range up to four inches.

NEW AVIATION PRODUCTS

Porcelain Enameled Airmarkers

Method for fastening highly reflective porcelain enameled airmarkers to flat or curved roofs without puncturing roofing surface or requiring framework was achieved recently in airmaker installation at Wheaton, Ill. Favorably received by CAA, project was initiated by local CAP Squadron 611-12, and marking development was engineered by **Porcelain Enamel Specialties Co.**, Baltimore, Md. Design consists of series of flat enameled sheets of a standard shape which permits construction of any letter or numeral


PORCELAIN ENAMEL
MOPPED TAR
NEW 15 lb. FELT
MOPPED TAR
NEW 15 lb. FELT
PLASTIC CEMENT
SCRAPE SLAG FROM EXISTING ROOF IN LETTER AREA INCLUDING A MINIMUM OF ONE FOOT FROM EDGE OF LETTER.

desired. Glass-like porcelain-coating on steel base is resistant to any weathering, being impervious to moisture penetration. Moreover, finish gives high protection against abrasion. In installation, letter-bed is first prepared on roof by removing slag down to existing felt. Next, two new layers of 15-lb. felt are laid in, first layer being mopped down with pitch or asphalt, depending on type of roof. Finally, ⅛-in. coating of asbestos fiber asphalt plastic cement is troweled on top layer of new felt and letters are then laid in, with liberal coating of litharge of lead applied at panel edges and intersections.

Aircraft Windshield Cleaner

"C" windshield cleaner, now added to Whiz aviation chemicals line made and marketed by **R. M. Hollingshead Corp.**, Camden, N. J., is described as an all-purpose product which may be used safely on any type of plastic or glass surface, resulting in bright, perfectly clear finish. Applied with soft flannel cloth, left to dry, then wiped off, cleaner is reported particularly effective in removing bug juice, oily films, and other kinds of dirt which accumulate on aircraft.

Airline Luggage Weigher

Especialy constructed for weighing luggage, trunks, and other freight, a new dial-platform scale is ready for immediate delivery to air terminals, states the maker, **Detecto Scales, Inc.**, 1 Main St., Brooklyn 1, N. Y. Scale comes in several weight capacities, ranging from 60 to 300 lb., and it is available with dial face reaching either 36 or 51 in. above floor. Platform is 10½ by 14½. Mechanism employs combination lever and spring principle.

Dual Fuel Pumps for Turbines

New safety advance is reported with development of dual tandem-type high pressure fuel pump for aircraft turbine power plants. Maker is **Pesco Products Div., Borg-Warner Corp.**, 310 S. Michigan Ave., Chicago 4. Dual unit, affording standby pump should main engine pump fail, is installed on engine accessory drive gear box. Eliminated is weight (about 30 lb.) of electric motor and generator employed to operate standby pump on early-type jet craft. In new unit, two standard gear-type fuel pumps are combined with automatic change-over valves, all enclosed in a single housing.

Weight-Saving Seat Filler

Superfine PF Type A44 Fiberglas material is offered for filler in aircraft seat and seat-back cushions by **Owens-Corning Fiberglas Corp.**, Toledo 1, Ohio. Termed low in cost, non-combustible, and resilient for excellent riding qualities, this lightweight filler is stated to save 2 lb. per seat in a typical aircraft installation. Treated with resin binder, fibers are shaped into batts of 0.5-lb. density, 1-in. thick. These, in turn, are formed into packs for insertion in seats according to procedure outlined by company.

New Aircraft Transceiver

"Aircrafter" is new transceiver aircraft radio equipment announced for full production this summer by **Lear, Inc.**, 110 Ionia Ave., NW, Grand Rapids 2, Mich. Available for either 12 or 24v. operation, set has transmitter section which operates on six very high frequencies, with power of approximately 2w. on the antenna. Details: Will cover beacon and also standard broadcast band, with loop operation on both bands; will operate at either headphone or speaker level, with approximately 5w. output for speaker; and includes simultaneous range filter, instrument light, and dimming control. Weight of complete unit is less than 15 lb.

Compound Cuts Static Dust

Static set up on plastic airplane noses, domes, and windows by friction of airflow—a handicap, since it tends to attract dust and dirt and thus obscure these surfaces—is reported either eliminated or reduced by Merix Anti-Static Compound 79. Maker is **Merix Chemical Co.**, Wrigley Bldg., Chicago 11. Applied by dipping, brushing, or spraying of plastic surface, non-flammable fluid dries to a thin film which cannot be determined by the naked eye. If desired, it may readily be washed off with water. Sample 32-oz. quantity of compound is available; standard size containers are 1 and 5 gal.

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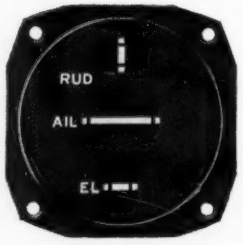
Model 888

Weston *Cross-Pointer Indicator* (ID-48)

—used with Instrument Landing Systems

Weston *Trim Indicators* (O-1)

—used for *visual indications* with Automatic Pilots



Model 883

Weston *Free Air Thermometers*

—featuring the new flush mounting Resistance Bulb

***FOR ADDITIONAL INFORMATION** write Weston Electrical Instrument Corporation, 616 Frelinghuysen Avenue, Newark 5, New Jersey.*

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NEW ORLEANS · NEW YORK · PHILADELPHIA · PHOENIX · PITTSBURGH · ROCHESTER · SAN FRANCISCO · SEATTLE · ST. LOUIS · SYRACUSE · IN CANADA, NORTHERN ELECTRIC CO., LTD., POWERLITE DEVICES, LTD.

New Wichita Firm Takes Culver Plane Sponsorship

Superior Aircraft now ready to provide replacement parts for prewar and postwar orphans.

Orphan Culver planes, both prewar and postwar, now have a new parent, Superior Aircraft Co., organized by two former Culver officials, and located in part of Boeing Airplane Company's Plant 2 warehouse.

R. C. Faris, former assistant to the Culver president, in charge of purchasing, and William W. Taylor, former Culver chief test pilot, and Oklahoma dealer at the time the company went into bankruptcy, are co-partners in the new company.

It has purchased all rights to manufacture the postwar 85 hp. two-place Culver Model V, and is now ready to provide replacement parts for all Culver models.

Faris said component parts are now ready to build approximately 50 complete Culver Vs and there are many extra parts.

Superior also has all blueprints for every Culver model including the Model V and when the market warrants, Superior Aircraft hopes to resume production of an improved version of this plane.

Design efforts are being made to reduce gross weight of the Model V by 200 lb. Other changes would include installation of full span elevators, and changing the interconnected flap and stabilizer control for two settings, one for power on and the other for power off. Lightening of the plane would be accomplished partly by removing equipment. Retraction of the tricycle gear would be accomplished manually, eliminating electric powered mechanism and starter would be removed. Fuel tanks would be moved from wings, and placed where present luggage compartment is located, forward of cockpit. Fuel capacity would be reduced from 32 to 20 gal. A new luggage compartment would be located aft of bulkhead, with outside entrance.

The new partners are hopeful that the proposed changes will cut approximately $1,000 from the plane's production cost, but have set no price tag on a revised model. The last sale price of the Model V listed by Culver was $4,200, but it was reported that the company was losing money on each plane sold.

Superior has about 20,000 sq. ft. of floorspace, including a small site on Wichita Municipal Airport in addition to the Boeing space. Faris said that his company had already received an offer for outright purchase of the business, but that the company hopes to continue independently. Financial support for the new company is being provided by a Wichita bank.

Superior, presumably, has no official connection with another new Wichita airplane company also started by former Culver personnel, Mooney Aircraft Co., headed by Al W. Mooney, former Culver vice-president of engineering, which is making an experimental one-place Model M-18. Taylor, however, has done some testifying for Mooney in the prototype M-18.

Resuscitation of the Model V is the third revival of a lightplane accomplished in recent weeks. Others were the two-place Swift, nearest performance competitor to the Model V, which goes back into production at Texas Engineering & Manufacturing Corp., Grand Prairie, Dallas, Texas, and the four-place Navion, which soon will make another bow as the product of the Ryan Aeronautical Corp., San Diego.

Congressional Flyers Get Piper Super Cruiser

With presentation recently of a new three-place Piper super cruiser for the use of Congressional Flying Club members, air-minded members of Congress had two new lightplanes available for their use. They had previously been presented with a Luscombe Silvaire 85 hp. two-place plane. Both planes are being kept at Ashburn Flying Service, Hybla Valley Airport, Alexandria, Va.

John Hinson, Piper distributor for the Washington-Baltimore area, presented keys of the plane to Carl Hinshaw, (R., Calif.) president of the club at a ceremony at the airport. Other Congressmen attending the ceremony included Evan Howell (R., Ill.) vice-president, Henry Larcade, Jr. (D., La.), Claire Engle (D., Calif.), Henry Latham (R., N. Y.), Edward Jenison (R., Ill.). Approximately 34 members of Congress and approximately 81 Congressional secretaries are members of the club and about a third of these are flying students or pilots.

NEW HAWTHORNE JACKSONVILLE OPERATION

New operations building and pilot lounge of Hawthorne Flying Service at Craig Field, Jacksonville, Fla. municipal airport No. 2, recently completed, is first unit in construction program planned at airport. First hangar also is nearing completion. Modernistic structure features overhanging roof on three sides of building to shade spectators. Building contains operations office, show case of aeronautical supplies, lounge and wash rooms. Kenneth Brugh is manager of Jacksonville operation, latest addition to Hawthorne airport operations chain in southeastern states, headed by Beverly Howard, Charleston, National Aviation Trades Association president, and international acrobatic flying champion.

Need More Radio Service Facilities

Adequate service facilities in the field for the large number of personal plane radios now in use are "sadly lacking," James Riddle, president of National Aeronautical Corp., national distributor for Hallicrafters Aviation Radios, reported at the recent Aviation Distributors and Manufacturers Association summer meeting at Mackinac Island.

A survey in May indicated that 52 percent of all new personal planes delivered had been equipped at the factory with radios, Riddle said. Progressive radio manufacturers are currently engaged in establishment of many additional factory-approved service stations. Hallicrafters has an ultimate goal of having service stations located so that a customer will be able to get free warranty service within two hours flying range of any point in the country. Distributor members of ADMA were urged to accept their service responsibility in the radio merchandising chain and to establish good radio service facilities.

VHF ground receiving facilities are lagging far behind planned installation schedules, Riddle reported, and widespread use of both the 3105 kc. channel and VHF channels is predicted for at least two more years. More widespread use of GCA radar to aid private pilots is anticipated, with several cases already reported where the GCA has aided private flyers.

Riddle was re-apopinted Chairman of the ADMA Aircraft Radio Committee and announced that the committee was petitioning CAA for a "better break for the private pilot," in range and control tower communications. The petition pointed out that the average power available for personal plane radio is 10 watts, feeding into a short antenna, and yet the pilot is transmitting in competition with all the higher powered transmitters and long antennas used by large non-scheduled and cargo planes. Revision of present CAA techniques, if necessary, to give the private flyer better intercommunication is urged by ADMA.

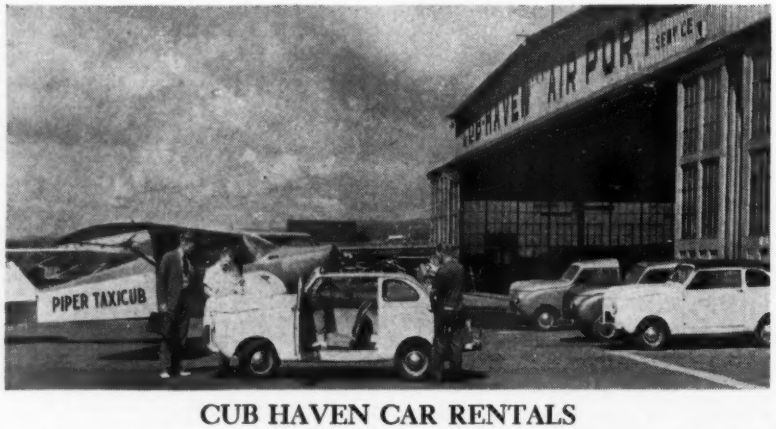
Progress of postwar personal plane radios from the personal plane prewar equipment was cited. Prewar two-way sets weighed 18 to 20 lb. as against an average of 11 to 12 lb. postwar, and prices continue around the $150 to $200 prewar average, which actually represents an important reduction when the devaluation of the postwar dollar is considered.

Helicopter Models For Pilot Training

Electric-powered scale helicopter models for use in training helicopter pilots are being developed in Buffalo as a side-line project of two Bell Aircraft Corp. employes. John E. Duncan, chief of model research, and William H. Bayley, assistant to the commercial sales manager, were on the original staff of 15 which built the prototype of the present Bell Model 47B helicopter, and became interested in model possibilities as changes on the original helicopter were worked out through model use. Duncan has been building aircraft models for 18 years and holds several records for flying models.

About two years ago the two men formed the firm of Duncan & Bayley, Inc., and set up a research workshop on flying helicopter models in Buffalo. They completed their first successful electric powered model in February. It is equipped with a full sized set of remote controls, by means of which the student pilot can operate the flying model in tethered flight much as he would fly a full scale helicopter and learn from the model the helicopter reactions to various combinations of controls.

The electric powered model weighs 4½ lb. and has two 24-in. rotor blades made of balsa and hard lemon wood.



CUB HAVEN CAR RENTALS

Four diminutive Crosley autos, one of truck-type, are available for pilot rentals at Cub Haven Airport, Lock Haven, Pa., at $2 for 6 hr. Cohick U-Drivit Co. is providing cars in conjunction with Piper Aircraft. Minimum rental is 60¢ for first hr., plus 5¢ a mi. A $3 flat rate for 12 hr. use is made, while 24 hr. use costs $4 plus mileage charge. Larger standard-size cars rent at 7¢ a mi. Rates include insurance charges.

Taylorcraft Employes Entitled to Claims

Approximately 800 former employes of Taylorcraft Aviation Corp., at Alliance, Ohio, are entitled to prior claims on the bankrupt company's liquidated assets for regular pay, bonuses and severance pay earned during the three months before filing of a bankruptcy petition against the firm last August, according to a recent ruling by Federal Referee Carl Friebolin at Cleveland.

Involved is approximately $75,000 in regular pay plus bonuses of $5,500 and severance pay of approximately $5,000. Only the bonus claims of union members will be allowed, the referee has ruled, because the bonus was stipulated in a contract between the union and the company.

The Taylorcraft name and some of the manufacturing equipment was sold in bankruptcy proceedings to a group of former Taylorcraft distributors and dealers headed by C. G. Taylor, founder of Taylorcraft, who had been disassociated from the corporation for several years prior to the bankruptcy proceedings.

1,000 Planes Are Expected At Farmers' Midwest Meet

Fred Weick, designer of the Ercoupe; William T. Piper, president of Piper Aircraft Corp., and Gov. Kim Sigler, of Michigan, a private flyer, will be principal speakers at the Aug. 4 and 5 meeting of Flying Farmers of midwestern states, at the University of Illinois airport, Champaign-Urbana, Ill. Farmers from Indiana, Michigan, Wisconsin, Iowa and Illinois are expected to fly in, with approximately 1,000 private planes in all, expected at the airport. Exhibits of new agricultural equipment and new personal planes will be shown and demonstrations will include crop dusting in a Bell helicopter by Arthur Curry, Galesburg airport operator, a Goodyear crosswind landing gear flight demonstration, a Goodyear blimp flight show, and a flight of P-80 jet fighters from Langley Field, Va.

New Bellanca Gear Optional Feature

An electrically actuated landing gear retraction mechanism is announced by Bellanca Aircraft Corp. as a new optional extra equipment feature on new Bellanca Cruisair Sr. four-place planes, at a price of $306 installed at the New Castle, Del., plant. The electric mechanism also may be installed in any of the 1946 or 1947 Cruisairs already in the hands of customers and is available from the factory in kit form for field installation. The mechanism will replace, except for emergency use, the manually-operated retraction system which is standard on the Cruisair Sr., consisting of a crank which actuates a torque tube and a chain drive to "wind up" the wheels.

Beech, Bellanca Hike Four-place Prices

Four-place airplane prices spiraled upward, last week with announcements that the all-metal Beech Bonanza, and the Bellanca Cruisair Sr. were subject to increases effective July 14 and July 22, respectively.

Beech boosted the Bonanza tag to $8,945, substantially a $1,000 increase over the previous $7,945 ticket, while Bellanca's Cruisair Sr. basic list price on Model A advanced from $5950 to $6350.

Effect of the increases will be watched closely by the personal aircraft industry, since virtually every manufacturer is torn between rising costs and apprehension as to the number of customers he will lose by a price hike.

▶ **New Trend**—A trend in industry merchandising away from any hope of soon attracting the personal aircraft mass markets so glibly discussed in the immediate postwar era appears reflected in the price hikes. A manufacturer with enough financial backing and engineering know-how to turn out a good four-placer for $5,000 or less, in quantities sufficient to make some money at that price, might however bring about a sharp reversal in this new trend. Possibly three competitors now grooming new all-metal four-place planes, Luscombe, Cessna and Ercoupe, may take this chance when they put their new planes into the market.

Jack Gaty, Beech vice-president and general manager, says that his company found the $7,975 price of the Bonanza inadequate because of the "very high degree of refinement of the airplane, its complete instrument and radio equipment, and our very careful testing program of all production airplanes," and also because of continuous improvements made on the airplane. New price for the Bonanza did not apply to orders on which the company held firm customer deposits as of July 14. However, this applies only to customers who had made the full $1,800 firm order deposit, calling for specific price and delivery date, and not to customers who had made the preliminary $500 returnable deposit for a priority certificate.

▶ **First Reports**—Industry reports that Beech was going to increase the Bonanza price to approximately $9,000 were first heard last fall during the National Aircraft Show at Cleveland. At that time, a spokesman for the company advised that the company "had not increased" the price, but that there was no commitment which would prevent a future price increase.

H. L. Thompson, Bellanca secretary, in announcing the Cruisair Sr. price hike says that all Bellanca distributors have been given notice of the increase since July 2. The increase applies proportionately to the four other Bellanca models as well as to the basic Model A. It is understood that major part of the Bellanca increase will be used in hiking the distributor's percentage from 20 percent to the 25 percent which is more nearly standard in the industry.

▶ **Other Competitors**—Among other major competitors in the four-place plane field is the Navion, currently being marketed by North American Aviation, and soon to return to production in the Ryan Aeronautical Co. plant at San Diego. Ryan has indicated no change is contemplated in the $7,750 flyaway price of the Navion, which would give it a considerable price advantage in competition with the Bonanza.

Largest seller among the four-placers is the Stinson Voyager 165, with a standard model selling for $5,847 and a Flying Station Wagon model with removable back seats for light cargo, which sells for $100 more. The Voyager prices have been in effect for about six months and there is no immediate indication of a change. Two major factors in the Voyager's leadership in shipments of planes in recent months have been its price, the lowest in the four-place field, and the aggressive Stinson sales policy.

Only other landplane in the four-place class currently being marketed is the Fairchild F-24, for which new lower prices were announced in May, ranging from $6,956 with "modernized" Warner 165 hp. engine to $7,256 for an F-24 with a Ranger 175 hp. engine, while previous prices ranged from $8,500 to $8,875. Price gap still remaining between the closely competing Fairchild and Stinson is probably one explanation for the slow turnover of the F-24s.

Supplier Grows Rapidly

Standard Parts & Equipment Corp., Ft. Worth, recently took over distribution of the former Globe Aircraft War Assets surplus aircraft stock valued at more than $5,000,000 in addition to the parts and equipment stock valued at more than $2,000,000 already held by Standard.

Organized Jan. 1, 1947, the company has rapidly grown to a strong position in national aircraft supply. Organizers include Roy Browning, president; Guy Murray, assistant general manager; Allyn Berry, secretary-treasurer; Doyle Murray, Ben Dyess and Gene Murray. Standard now holds distributorships for many aviation manufacturers and also handles distribution for War Assets Administration on hardware and accessories. Sales volume of more than $90,000 a month is reported for the company's first six months of operation. The company plans to add other commercial products to supplement its aircraft supply program and develop a balanced sales program.

Airport Short Course

A four-day short course for airport managers and owners will be conducted at the University of Southern California College of Aeronautics, at Hancock Field, Santa Maria, Calif. from Aug. 18 to 22. Dormitory reservations are being provided at the airport campus for registrants, and plane tie-down space will be provided at the field.

3000th VOYAGER DELIVERED

Col. Jack Lapham, center, operator of Flying L Dude Ranch for private flyers at Bandera, Texas, recently purchased 3,000th postwar Stinson, a Flying Station Wagon, delivered by William Klenke, Stinson general sales manager, left, and Les Bowman, Ft. Worth, Texas Stinson distributor.

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BRIEFING FOR DEALERS AND DISTRIBUTORS

ENGINE OVERHAUL CENTER PLANNED—Negotiations are being completed for establishment of a new engine overhaul firm for lightplane engines, operating under the name of Aircraft Maintenance Engineering Corp. and headed by William Claflin, previously associated with Pratt & Whitney, Wright Aeronautical and Wiggins Airways in engine service work. The base probably will be located at a central New Jersey airport and will provide service for plane owners and fixed base operations in the northeastern region. Claflin hopes to begin operations by Jan. 1, and expects to operate a trucking delivery service through the area he serves, with an engine exchange program including his own company's overhauls and factory rebuilt engines. AMEC will set up a line overhaul system using advanced production tooling which Claflin is designing, and he anticipates his company will be able to reduce engine overhaul costs approximately $100 below present costs.

SKY RANCH DEVELOPMENT—Construction is now underway on a runway for a new sky ranch for flying vacationists at Hot Springs National Park, Ark. Vance W. Bryant, owner of the Jack Tar Court Hotel at Hot Springs, also plans to operate a GI flight training school at his new field. Main runway now is 3,000 ft. and eventually will be extended to 8,000 ft. so that it will accommodate any size plane. Two other runways will be 3,000 and 2,500 ft. A sky park hotel will adjoin the flying field, with recreational facilities including artificial lakes stocked with game fish, swimming, riding, and boating. A seaplane base will also be established on nearby Lake Hamilton, Bryant said. He envisions a large air tourist business will develop from surrounding cities such as New Orleans, Houston, Dallas, Ft. Worth, Oklahoma City, Tulsa, St. Louis, Memphis and Birmingham, all of which are from two and a half to three and a half air hours distant from his new project.

FLY-IN SHOPPING CENTER—Another new project which will add to the utility of the personal plane and eventually the helicopter is the Hampton Village Shopping Center which opened in St. Louis recently. Convenience of having an aircraft landing facility was scheduled to be demonstrated by a St. Louis housewife, Mrs. Harry C. Vollmar, who was to fly in a Bell helicopter from her own lawn to landing in the shopping center, do her shopping, and return home via helicopter. The helicopter landing area will soon be augmented by a landing strip for conventional personal planes, being built as an integral part of the 15 block development, which sells, the management reports, everything from apricots to zinnias.

RADIO TEST—Round-The-World flight of Evans and Truman in two Piper Super Cruisers, will prove probably the most gruelling service test that Bendix Flightweight radio equipment has yet had. Combined weight of radio communication and navigation equipment supplied by Bendix is 26.87 lb. It includes a range and broadcast receiver with crystal controlled spot tuners for reception of 6440 and 2870 kc. Also direction finding equipment, a medium frequency transmitter, and the new Bendix VHF transmitter, which will be used for air-ground communications with control towers and airway stations, and can be used for communication making possible use of GCA radar landing aids, and communicating with U. S. Army and Navy stations in all parts of the world. Standard airplane battery supplies power for all the equipment.

CATA RECOMMENDATION ACCEPTED—Three days after receiving an unanimous endorsement by 80 percent of the members of the California Aviation Trades Association replying to a CATA poll for the Debs Bill creating a California Aeronautics Commission, Gov. Earl Warren signed the bill. Bill provides for a five-man commission with a full time state aeronautics director to receive a $12,000 annual salary. Bill permits commission to adopt temporary regulations but they expire unless they are enacted as legislation by the next session of the state legislature. This clause, an innovation in state aviation legislation, is expected to give aviation interests in California opportunity to combat effectively harmful regulations which could be passed by the commission, and nullify them through legislative action.

OHIO ZONING AFFECTS AIRPORTS—Nearly every airport built in Ohio from now on will probably be affected by an act recently passed by the General Assembly and signed by Gov. Thomas J. Herbert, authorizing county and township governing bodies to regulate the use of land in their respective territories. The law provides that 8 percent of the population of either county or township may petition for establishment of a zoning commission, or the board of county commissioners or board of township trustees may establish such a commission without such petition. The zoning will not directly affect municipalities within the county or township. However, in the event a municipality should wish to build an airport outside its limits, as frequently happens, presumably this would be subject to jurisdiction of the county zoning commission.

ALEXANDER McSURELY

Airlines Vie for Increased Share Of Record Airmail Appropriation

Post Office requesting $104,295,000 for payments to domestic and overseas carriers during fiscal 1948, up 66 percent over fiscal 1947.

By CHARLES ADAMS

A lean air transport industry, weakened by the deficit diet which accompanied low passenger load factors during the past six months, is looking hopefully toward the record $104,295,000 airmail appropriation requested by the Post Office Department for fiscal 1948.

At first glance, the thumping 66 percent increase in mail funds in fiscal 1948 over fiscal 1947 appears to make ample provision for the substantial boosts in rates now being requested by almost all of the certificated carriers. But closer inspection shows that most of the additional money will be paid feederlines and overseas carriers for mail transportation on routes which were inactive during part or all of fiscal 1947.

▶ **Division Given**—Breakdown of the $104,295,000 asked for the fiscal year which began this month shows $53,000,000 tagged for foreign and $51,295,000 for domestic airmail transportation. The proposed fiscal 1948 foreign airmail appropriation is almost double the $28,598,000 earmarked for fiscal 1947, and the domestic allotment for fiscal 1948 is $17,295,000 above the $34,000,000 appropriated during the past fiscal year.

Approximately two-fifths of the $51,295,000 domestic airmail appropriation has been allocated tentatively for feederlines on the basis of a full feeder network of between 25,000 and 30,000 route miles. Recent developments have indicated that considerably less than 25,000 miles of feeder routes will actually be operating during most of fiscal 1948, thereby leaving the possibility that some of these funds can be used to meet the increased needs of the domestic trunklines.

▶ **Increases Asked**—Of the 11 domestic trunkline carriers which operated on a nonsubsidy mail pay basis of 45 or 60 cents a ton mile during calendar 1946, all but three now have applications for increased compensation pending before CAB.

Most recent petition for added mail pay has come from National Airlines, which has experienced a sharp drop in operating revenue during recent months as its load factor skidded from 69.72 percent in March to 45.68 percent in June. After showing an operating profit of about $446,000 during the first four months of this year, NAL suffered an operating loss of $45,063 in May and has told CAB that considerably larger losses are indicated for June.

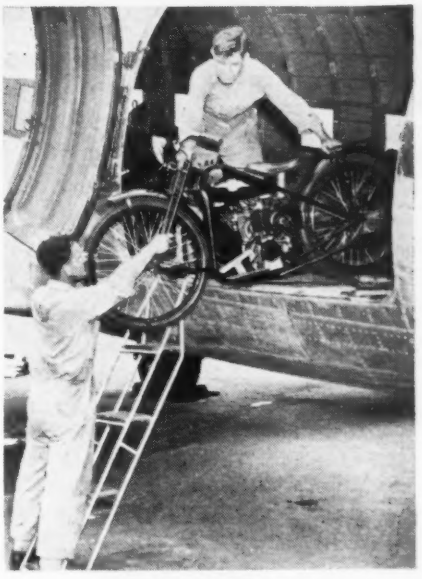
▶ **Wage Factor**—The carrier admitted that part of its revenue decline represents a normal seasonal trend. But it foresaw steadily rising costs and pointed to pending wage negotiations with employe groups as reasons why its 60 cents a ton mile rate is insufficient.

Domestic airlines in the nonsubsidy group which have applications for mail pay increases pending include, besides National, United, TWA, Eastern, Braniff, Western, Chicago & Southern and Capital (PCA). Only American, Northwest and Delta had not filed for additional compensation by July 21.

▶ **CAB Acts**—For all practical purposes, the 45-60 cents nonsubsidy level has been cracked by recent CAB action on the mail rate petitions of PCA, Western and C&S. In these cases, the Board authorized temporary mail pay increases up to seven fold but technically kept the basic 60-cent service rate.

Use of a "minimum capacity factor," which placed a floor under the airlines, mail load, permitted payment for volume in excess of that actually carried. Thus, PCA while still technically on a 60 cents a ton mile basis, is expected to receive upwards of $4 a ton mile during calendar 1947. National has asked CAB for a minimum capacity factor for its system.

▶ **Feeder Rate**—Meanwhile, the feeders are encouraged by CAB's final action this month on Pioneer Air Lines' mail rate. The nation's first feeder was given 53 cents a plane mile from Aug. 1, 1945, (when it



PRIVATE TAXI

This 150-lb. Servi-Cycle which averages 100 mi. to a gallon of gasoline is standard equipment aboard Willis Air Service cargoplanes. It has given WAS crews immediately available ground transportation around out-of-the-way fields in the U. S. and Latin America.

Mail and Passenger Statistical Comparison

Eleven Largest Domestic Carriers

(Seven years—1940 to 1946 inclusive)

Carrier	Total Mail Pay	Percent Mail Pay to Total Operating Revenue	Mail Revenue per Plane Mile	Mail Pay per Ton Mile (1946 only)	Passenger Revenue
United	$44,466,000	20.52	$.2055	$0.45	$155,803,000
American ..	32,252,000	12.39	.1241	.45	206,794,000
TWA	29,934,000	18.70	.1848	.45	117,974,000
Eastern ...	15,638,000	10.98	.1040	.45	118,338,000
Northwest .	11,044,000	19.12	18.45	.60	43,801,000
Braniff	5,587,000	14.54	.1271	.60	30,889,000
Western ...	4,196,000	15.05	.1554	.60	21,773,000
Delta	4,039,000	14.22	.1323	.60	23,228,000
PCA	3,824,000	7.52	.0741	.60	44,363,000
C & S	3,657,000	15.75	.1476	.60	18,494,000
National ..	2,233,000	11.56	.0927	.60	16,313,000
Totals....	$156,870,000				$797,770,000

(Study prepared in part by PCA)

Martin Memo

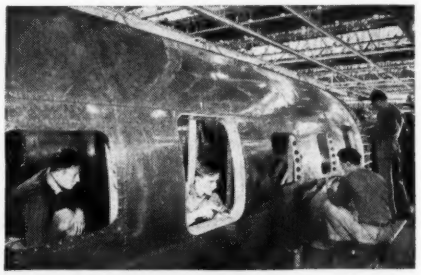
Published by The Glenn L. Martin Company

Baltimore 3, Maryland

On Leading Airlines Soon . . . Here, the ultramodern Martin 2-0-2 airliner is shown in flight during CAA certification tests. Speedy Martin luxury liners will soon be a familiar sight at airports the world over when they go into operation for these great airlines and cargo carriers: Capital (PCA) . . . Eastern . . . Chicago & Southern . . . United . . . Northwest . . . Delta . . . Panagra . . . Cruzeiro do Sul (Brazil) . . . Aeroposta (Argentina) . . . Nacional (Chile) . . . Mutual . . . Flying Tiger . . . Air Borne Cargo . . . U. S. . . . Willis.

Looking for Cold Weather . . . To thoroughly test a new thermal anti-icing system, now standard equipment on all Martin transports, a Martin 2-0-2 was sent to Minnesota. Flying in the cold layers of air north of Minneapolis, the engineers and CAA representatives were able to choose varying types of icing conditions for their experiments. The system which involves passing heated air through the wing and tail assembly proved successful . . . the experiments were acclaimed by aviation experts as a big step forward in all-weather flying.

"A Real Buy" Here's Why . . . Martin has orders for more new transports than any other manufacturer. Through quantity production Martin is able to spread the cost of Martin transports over a larger number of planes, giving purchasers these great new airliners at low cost.

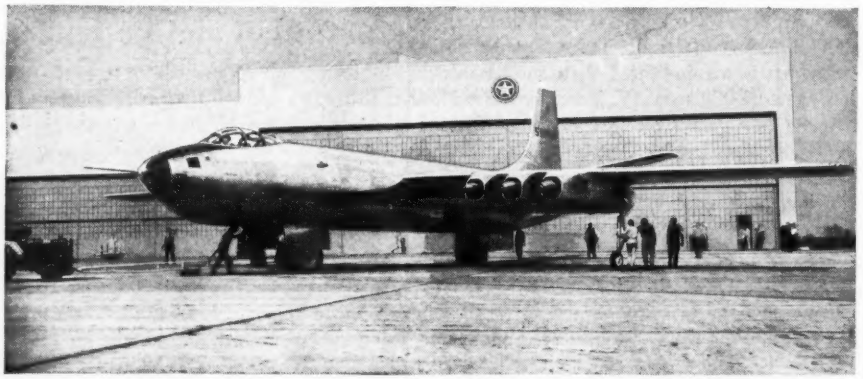


Low-Cost Maintenance . . . These are not windows in the Martin 2-0-2. They are a few of the numerous accessory compartment openings which provide easy access to the 2-0-2's electrical and hydraulic systems. These built-in timesavers mean low maintenance and servicing costs. The openings shown above are in the bottom of the fuselage.

Going Up . . . 235 Miles . . . Rocketry is one of the more advanced research projects of the Martin Company. Now under construction is the Neptune, first of ten experimental rockets, 45 feet long, capable of flights to 235 miles above the earth's surface. These huge rockets, being built by Martin for the Navy, are the first all-American long-range missiles of supersonic speeds.

Increased Profits for Airlines . . . The new twin-engine Martin 2-0-2 carries 36 to 40 passengers (or 15,000 pounds of airfreight in the cargo version) at speeds 100 m.p.h. faster than the planes they supplant. But more important is the fact that this modern transport needs only 19 passengers (by ATA formula) to break even. Thus, airline profits with the Martin 2-0-2 can be as high as 50% of the total passenger payload. That's one of the big reasons 15 leading airlines have ordered Martin transports.

As a Military Transport . . . The Martin 2-0-2 offers many advantages. It cruises 100 m.p.h. faster than prewar twin-engine transports. It can carry 50 completely equipped troops or 15,000 pounds of cargo. Built-in features include new thermal anti-icing equipment . . . efficient van Zelm ailerons . . . tricycle landing gear . . . large cargo doors for easy loading and unloading.



Newest Jet Bomber . . . The high-speed, long-range XB-48 was built by Martin for the Army Air Forces. Powered by six jet engines, it is the largest multi-jet conventional type plane yet constructed. The XB-48 also pioneers a new bicycle type landing gear developed by Martin for high-speed aircraft.

25,000 Flying Hours . . . During static tests, the Martin 2-0-2 was subjected to wrenching and straining equivalent to 25,000 hours of flying or 10 years of average service. Results of these rigorous tests are further proof of the superiority of the Martin 2-0-2's advanced design and construction.

Martin AIRCRAFT

Builders of Dependable Aircraft Since 1909

Mail Pay Scale

Wide differences in mail pay received from the Post Office by large and small airlines have been largely obscured by the fact that the former are paid on a ton mile basis and the latter on a plane mile basis. Actually, some feeders operating newly-opened routes on which airmail traffic is just beginning to be developed are being paid 100 times as much as the larger trunklines for carrying one ton of mail one mile.

The "Big Four" trunklines, American, United, TWA and Eastern, receive 45 cents a ton mile. Braniff, Chicago & Southern, Delta, National, Northwest, PCA and Western were paid 60 cents a ton mile in 1946. Payments to subsidized carriers last year were: Colonial, equivalent of $1.50 a ton mile; Continental, $3.80; Mid-Continent, $4.55; and Northeast, $6.85. First quarter 1947 showed All American Aviation receiving $20 a ton mile on its pickup route, and feeders being paid as follows: Empire, $22; Florida, $51; Monarch, $35; Southwest, $13, and West Coast, $50.

started operations) to Aug. 31, 1946, and 60 cents a plane mile from Sept. 1, 1946, to May 31, 1947. These rates will enable Pioneer to show a 7 percent profit on its investment.

For the period after June 1, 1947, CAB has decided to adopt a "sliding scale incentive rate formula" for PAL which may become standard for all feeders. The formula provides maximum mail pay of 45 cents a plane mile when the carrier's passenger load factor is 35 percent or lower, and mail compensation automatically drops one-half cent a mile for each 1 percent increase in load factor.

Canada States Policy On Air Service Licenses

Canadian commercial air services, whether scheduled, nonscheduled or charter, must be operated primarily as a commercial air services and not as secondary activities of a company in some other business. This ruling was made recently by the Canadian Air Transport Board in rejecting applications by mining and fishery companies for licenses to operate commercial air services in conjunction with their main business.

CATB said public air service would suffer if other activity of the companies required preference. The board ruled that firms which wanted their own air operation under a separate name could apply for a contract service license, whereby the air service would be conducted for a group of companies owned by or related to one holding company. A number of such licenses have been issued by CATB to air services operating under contract.

Western Boosts Spring Earnings

Economies important factor in carrier's comeback after fight for survival last winter.

Western Air Lines, which last winter had its back to the wall in a fight for survival, has turned in a net profit for the second successive month as a result of its increased mail rate, higher passenger fares and traffic, and an aggressive cost reduction program.

T. C. Drinkwater, WAL president, reported consolidated net profit of $143,582 in May, compared with a net loss of $142,920 for the same month last year. The carrier first moved into the black during April, when it earned $24,616 after suffering a first quarter consolidated net loss of $680,868.

▶ **Revenues Rise**—Western's total revenues for May, 1947, were $1,254,315, while operating expenses were $1,110,732. During the same month last year, revenues aggregated $917,575 and expenses $1,060,495. Revenue passenger mileage in May was up 10 percent over April and 20 percent above May, 1946.

While recovery of passenger revenues after the winter slump and increased mail pay have been important factors in Western's comeback, the company's current optimism would not have become possible without the cost-cutting program. Here's what Western has done lately to nurse its pennies:

• **A 28 Percent Cut in Personnel** has been effected since Jan. 1, with staff reductions widespread through traffic, advertising, publicity, treasury, stores and purchasing, and passenger service departments. Staff-trimming may be expected to continue, but at a much slower rate.

• **One Standby DC-4** has been sold to Australian National Airways.

• **Maintenance Spare Parts** bought in anticipation of purchasing 20 Convair 240 transports have been sold heavily following WAL's cutback of the Convair order to 10 units.

• **Ticket and Administration Offices** have been consolidated into single quarters in cities where more than one office previously had been maintained.

For the future, Western has programmed additional economies that will be immediate revenue producers, and at least one proposal will gain the attention of all domestic air carriers.

▶ **Pact With American**—While final negotiations have not been completed, it is likely that WAL soon will announce an agreement with American Airlines for consolidation of ticket office and ground handling facilities.

Although new airlines have, in their early development, shared facilities of already established carriers, the tendency until now has been for completely autonomous passenger services and airport ground crews.

▶ **New Trend Seen**—Western and AA will establish a new trend when, in west coast cities served by both, they share the costs of perimeter ticket offices, airport passenger facilities, and airplane handling. In most instances the work will be handled by Western personnel, and American will be billed for its share of costs. In ticket offices of joint occupancy, personnel of the two airlines will remove identifying uniform insignia to establish the effect of neutrality of service.

Particular interest will attend the consolidation of airplane ground handling in view of the transport industry's extended debate over ground handling costs. Time wasted by ground crews, who frequently cannot be shifted to other productive work between airplane arrivals and departures, has been extensive. Consolidated ground handling plans often have been proposed and as regularly rejected by carriers who have insisted upon preserving the identity of their operations both in ramp equipment and ramp personnel.

▶ **Ramp Usage**—Under the Western-American mutual aid plan, ramp equipment will be shared, and a single ground force will handle the turn-around work on planes of each carrier.

Because of the formative stage of the plan, until now, neither carrier desired to discuss it. As a result, the preliminary groundwork gave rise to a strong rumor on the west coast that American was seeking outright purchase of financially-distressed WAL's coast routes from Los Angeles to San Francisco and on north to Seattle. WAL spokesmen now deny emphatically that the rumor ever had merit.

However, Western would like to sell its Inland Air Lines operations, and after CAB hands down a decision on the application of United Air Lines to purchase Route 68, Los Angeles-Denver, bids for Inland probably will be considered.

NWA Joins Other Lines In Filing Cargo Tariff

Railway Express Agency's attempt to enter the airfreight field through Northwest Airlines under the agreement signed in April, 1946, apparently has failed. On top of recommendations by CAB public counsel and a board examiner that the arrangement be disapproved, Northwest belatedly joined 18 other certificated carriers which have filed their official joint rate tariff through Air Cargo, Inc.

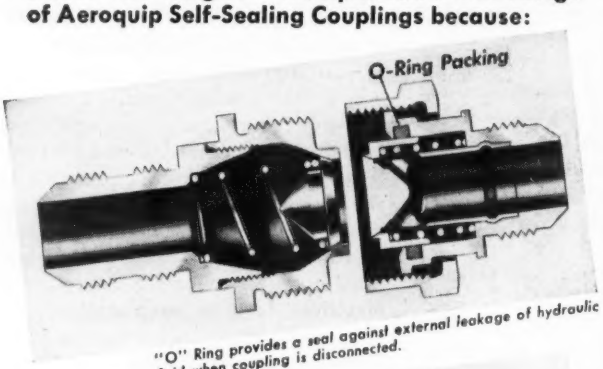
Airlines participating in the industry tariff besides Northwest are American, Braniff, Chicago & Southern, Colonial, Continental, Delta, Eastern, Inland, Mid-Continent, Monarch, National, Northeast, PCA, Pioneer, Southwest, TWA, United and Western. The 25 percent reduction in freight rates reflected in the tariff will be effective Aug. 1 if CAB approves.

LINEAR "O" RINGS

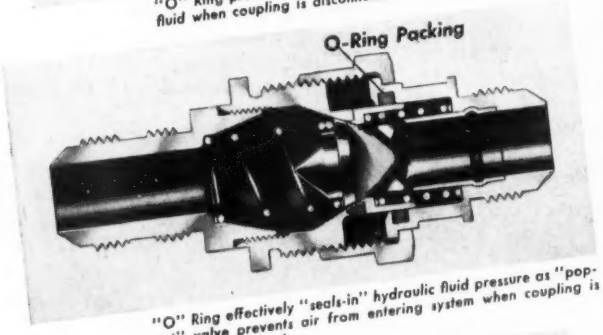
Effectively Seal

IN 3 WAYS . . .

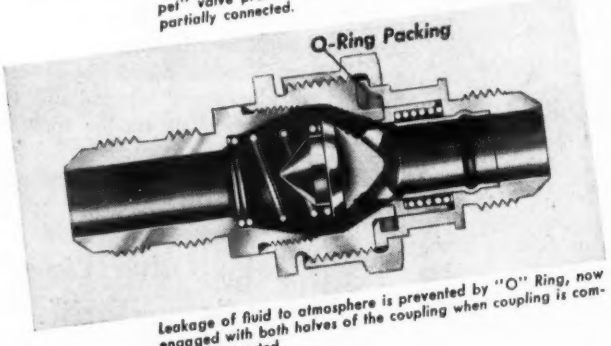
Linear "O" Rings are incorporated in the design of Aeroquip Self-Sealing Couplings because:



"O" Ring provides a seal against external leakage of hydraulic fluid when coupling is disconnected.



"O" Ring effectively "seals-in" hydraulic fluid pressure as "poppet" valve prevents air from entering system when coupling is partially connected.



Leakage of fluid to atmosphere is prevented by "O" Ring, now engaged with both halves of the coupling when coupling is completely connected.

Linear "O" Rings eliminate complicated, bulky assemblies. One "O" Ring effectively seals in either direction; requires no adjustment or mechanical pressure to maintain an effective seal; provides savings in manufacturing and assembly costs through design simplification; and can be installed by inexperienced hands.

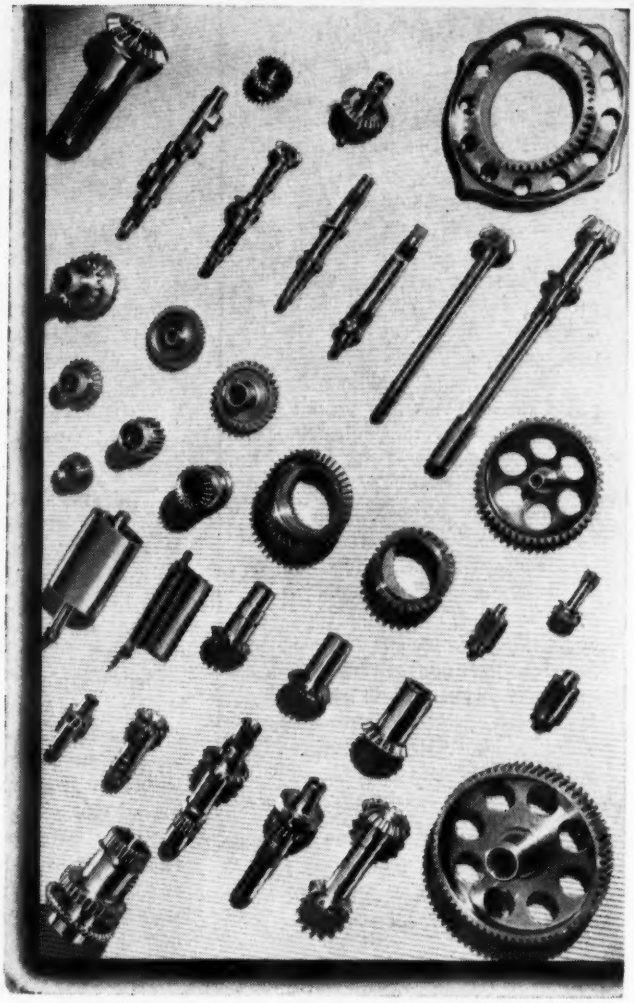
These moulded synthetic rubber seals are available in high-quality general-purpose rubber compounds adaptable to a wide range of temperatures, pressures, and fluids, or in a number of special compounds to meet unusual service conditions. Standard sizes range from ⅛" to 15½" I.D. and special sizes can be made as required. Write for detailed information.

Covered by Christensen U. S. Patent No. 2,180,795; all "O" Rings sold by Linear are manufactured under royalty agreement with patentee.

LINEAR INCORPORATED

Executive Offices and Factory

STATE ROAD and LEVICK STREET—PHILADELPHIA 35, PENNA.



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Investigator Reports On UAL Accident

The pilot of the United Air Lines DC-4 which crashed off the end of a LaGuardia Field runway during takeoff on May 29 has been accused of "faulty judgment" in making three separate decisions prior to the accident.

In an interim report submitted to the Senate Commerce Subcommittee on Aviation by its special investigator, Carl Dolan, the pilot's questionable decisions were listed as: 1. his weather analysis in estimating the speed of an approaching storm and in considering the varying gusts of wind which precede a storm; 2. his choice of runway; 3. his attempt to stop after traversing two-thirds of the runway. Dolan said that had the pilot reversed his decision (as was his prerogative) in any one of the three instances, the accident probably would have been avoided.

► **First Report**—The LaGuardia Field accident report is the first to be submitted to the Senate Subcommittee by its investigator, who was appointed early last month following the United and Eastern mishaps during the Memorial Day weekend. Acting independently of CAB's Safety Bureau, Dolan will also make reports directly to the Subcommittee on the Capital Airlines (PCA) DC-4 crash at Leesburg, Va., and the accident involving a chartered Burke Air Transport DC-3 in Florida two weeks ago.

Dolan said that with the UAL plane traveling at over 90 mph. when two-thirds of the way down the LaGuardia runway it could not possibly have been stopped on the remainder of the strip. "Inasmuch as the pilot had 400 additional horsepower, and his flap setting was only 15 degrees, he could have increased the flap angle, opened his throttles wide and taken off," the report declared. It pointed out that the braking effect of a plane which has practically reached its takeoff speed—with most of the weight of the craft on the wings rather than on the wheels—would naturally be ineffectual.

► **Little Margin of Safety**—"Choice of the short runway 18 with reference to his company's load specifications, gave the pilot very little margin of safety, the formula indicating that with a 60,000 lb. load he required 19 mph. headwinds. At takeoff time, the varying and shifting winds preceding the storm were blowing directly up the runway at 20 mph. With a change in wind direction, the component of the wind factor up the runway dropped to 15 mph., and under this condition the plane was overloaded during the takeoff attempt."

In recommending action to prevent similar mishaps, Dolan told the Senate Subcommittee that licensed dispatchers should be in entire control on the ground. "This would require a higher calibre of dispatcher than is now used," the investigator said.

► **Standardization Sought** — "Load chart specifications, which vary with the airline, should be standardized and uniform for a given type of plane, with CAA approving and spotchecking them. At present, one operator uses a graph, one a table, others charts. Still others take into consideration variables which some carriers do not—all of which tends toward different conclusions. Authority of traffic control towers to make final decisions on runways, weather, or other matters as the interests of safety dictate should be expanded," Dolan concluded.

► **EAL Hearing**—Meanwhile, the second phase of the CAB hearing on the Eastern Air Lines accident at Bainbridge, Md., May 30, has been completed in New York. In answer to testimony that pilots had made 18 reports of excessive vibration on the wrecked DC-4 between Mar. 24 and Apr. 22, Eastern asked and received permission to make a complete report on the plane's history during the period to show that corrective action had been taken. The vibration was in the nosewheel, and while newspapers headlined the development, CAB investigators said the difficulty was rather common, not particularly dangerous, and probably had no bearing on the accident.

New Reservations Plan Instituted by Braniff

Braniff Airways has given Mid-Continent Airlines and Continental Air Lines full authority to make and immediately confirm seat reservations on any flight between the 30 cities on Braniff's domestic system.

In the past, confirmation for interline or connecting space on another carrier had to be requested by wire from that company's home office, and frequently the message had to be relayed to the city controlling the desired space.

EAL, American Fight Increased Competition

American Airlines and Eastern Air Lines have leveled their biggest guns against would-be competitors on the heavily-traveled New York-Washington route, giving special attention to Atlantic Airlines' proposed 3½ cents a mile "day coach" service.

Further dilution of New York-Washington traffic would go far toward creating a 6 cents a mile airline rather than a 3½ cents a mile carrier, American told CAB in oral argument on the Middle Atlantic area case. Eastern pointed out that Atlantic's 28-passenger DC-3s would be competing with Constellations, DC-6s, Martin 2-0-2s and Convair 240s. Both American and Eastern doubted Atlantic's tourist-class operation (no hostesses, no free meals, etc.) could come close to achieving the economies which President S. J. Solomon predicted for it.

Nine existing carriers—All American, Braniff, Chicago & Southern, National, Northeast, PCA, TWA, United and Colonial—have applied for New York-Washington service in the Middle Atlantic area case. Colonial and Atlantic were recommended to fly the route by the CAB examiners, and Delta Air Lines has been favored by examiners for the same link.

Aerial Advertising

General Petroleum Corp. has become the first San Francisco area user of advertising carried by the war-surplus blimps and dirigibles of Douglas Leigh Co., New York. The Mobiloil "Flying Red Horse" is featured in flashing lights on the side of the lighter-than-air craft cruising over West Coast cities. Douglas Leigh also has lighted airships operating from Lakehurst, N. J., to cover the New York area.

BRANIFF CARRIES CESSNA TO PANAMA

Part of 10,000 lb. of cargo carried from Dallas to the Panama Canal Zone on a recent survey flight by Braniff Airways was this single engine Cessna 140 from Wichita, Kans. The crated plane, weighing 1,726 lb., was assembled in Balboa.

CAB Denies Brayton Grandfather Certificate

Brayton Flying Service, St. Louis, which last fall asked CAB for a grandfather certificate nearly eight years after the time limit for such applications supposedly had expired (AVIATION NEWS, Sept. 16), has lost its case before the Board.

The grandfather clause of the Civil Aeronautics Act directs issuance of certificates to air carriers applying within 120 days after the Act was signed. The Act was approved June 23, 1938, but three days before expiration of the 120 days the Board issued an order exempting nonscheduled carriers from economic regulation. Brayton contended the exemption relieved it of the requirement to apply for its nonscheduled grandfather certificate within 120 days of June 23, 1938.

In dismissing the application, CAB said the nonscheduled exemption did not extend the time within which requests for grandfather certificates might be filed. Brayton, was conducting nonscheduled common carrier services prior to the effective date of the Act and has operated continuously since then.

REA Ships Via TACA

Railway Express Agency has inaugurated air express service from the U. S. to more than 70 Latin American cities served by TACA Airways System in Cuba, Central America and the Canal Zone. Under the new joint handling procedure, shipments originating in the U. S. and consigned to points served by TACA will be routed to New Orleans or Miami for transfer.

Planes Vs. Ships

"Uncertainties of the rapidly increasing competition of air travel" are among reasons given by Matson Navigation Company for halting the conversion of its pre-war luxury liners Mariposa and Monterey.

This is the steamship company's first positive indication that the intrusion of air commerce between California and Honolulu is being felt by surface carriers. The stop-work order halted Matson's $6,000,000 program for restoration of the liners to passenger service following their wartime use as military transports.

At the same time, Pan American Airways Pacific-Alaska division announced that during June its total California-Honolulu air traffic amounted to 4,748 passengers, 86,876 lbs. of mail, and 81,149 lbs. of freight. United Air Lines, which started Honolulu service in May, carried 2030 passengers during its first month of operation.

SHORTLINES

▶ **American**—Board of directors has declared a regular quarterly dividend of 87½ cents a share on the corporation's $3.50 cumulative convertible preferred stock payable Sept. 1. . . . Airfreight shipments at Washington, D.C., reached a new high for the year in June, with 17,366 lb. outbound and 72,454 lb. inbound.

▶ **American Overseas**—Carried 21,411 passengers and 1,110,207 lb. of cargo across the Atlantic during the first half of 1947, more than double the passenger and cargo volume for the same 1946 period. AOA made 924 trans-Atlantic flights during the six months, flying an average of 118 passengers a day.

▶ **BOAC**—Reports a 94 percent load factor on its eastbound trans-Atlantic run during June, when it carried 989 passengers to Europe against 651 in May. Company's passenger traffic out of New York during the second quarter of this year increased 276 percent over the January-March period.

▶ **Capital**—Airfreight shipments reached a new peak of 998,514 lb. in June, up 41,751 lb. over the previous high mark in April and 345,494 lb. over May. Of carrier's 55 cities, Detroit originated the most airfreight —189,683 lb.—followed by New York/Newark and Chicago. Top three PCA cities in airmail production were Pittsburgh, Chicago and Washington, in that order, while New York/Newark led in system air express, followed by Detroit and Chicago.

▶ **Eastern**—Was slated to place a 60-passenger Constellation on its Chicago-Miami route last week. Plane will provide 2 hr. 15 min. nonstop daily schedules between Chicago and Atlanta and less than 5 hr. one stop trips between Chicago and Miami via Atlanta. An EAL Connie on July 16 set two new speed records by flying nonstop from Chicago to Miami in 3 hr. 45 min. and returning in 3 hr. 56 min.

▶ **Mid-Continent**—Will inaugurate daily flights to Paris, Tex., Aug. 1.

▶ **National**—Revises schedules Aug. 1 to permit transcontinental service between Miami and Los Angeles in 13 hr. 25 min. elapsed time. Passengers will connect with Delta at New Orleans and American at Dallas. . . . Carrier is teaming with Pan American Airways and Panagra in offering New York-Buenos Aires DC-6 service in 24 hr. 40 min. elapsed time. National connects with Panagra at Miami, and additional stops are made at Balboa, C.Z., Lima, Peru, and Santiago, Chile.

▶ **Northwest**—Was hampered by Government red tape on its first flights to the Orient this month. Because of "procedural delays in Washington," the carrier lacked official permission to carry revenue traffic to and from occupied Japan, with the result that passengers faced the prospect of spending all their time in Japan at the airport.

▶ **Peruvian International**—Has joined with Chicago & Southern Air Lines to map a sales program to increase air travel between the American middle west and South America's west coast. The new campaign is a further development of the interline sales agreement reached earlier between the two carriers.

▶ **Pioneer**—Inaugurates airfreight service Aug. 1.

▶ **Sabena**—Has flown the first DC-6 to Europe. Carrier will take the plane on a four-week, 24,000-mile tour of its European and African routes. Later, the DC-6 will be placed in service by Sabena between New York and Brussels.

▶ **Southwest**—Will accept airfreight shipments for the first time on Aug. 1.

▶ **United**—Plans to open its new cutoff service between Boise, Ida., and Reno, Nev., Aug. 1.

Viking Changes Name

Viking Air Transport Corp., uncertificated operator based at Lockheed Air Terminal, Burbank, Cal., has changed its name to Aero-Van Express Corp.

CAB ACTION

The Civil Aeronautics Board:

- Granted Pan American Airways temporary exemption authorizing non-stop service between Wake Island and Tokyo, Japan, and between Shanghai and certificated points (other than Manila) south of Hong Kong.
- Dismissed United Air Lines' request for suspension and investigation of Southwest Airways' local passenger tariffs establishing roundtrip excursion fares between Eureka, Redding and Yreka, Cal., and Medford, Ore., and establishing circle-trip short-limit fares between Medford and San Francisco and other points. (Docket 3018).
- Dismissed for want of prosecution route certificate applications of Airdrome Transport (Docket 1086), Zenith Airlines Co. (Docket 1540), Edgar T. Werthen (Docket 1672), Ernest Long (Docket 1827), James Walker Case (Docket 2158) and Golden State Airlines (docket 2159). Applications requested service in California area.
- Consolidated applications of Transairways, Inc., Julius E. Nervo, Pacific Air Lines, Pacific Air Transport, Bonanza Air Lines, Southwest Airways Co., Arizona Airways, TWA and United Air Lines in California-Nevada service case (docket 2019 et al.)
- Dismissed route application of Nevada Airways, Inc., (docket 2892) at applicant's request.

CAB SCHEDULE

Aug. 4. Hearing on Pan American Airways application for service to Melbourne, Australia. (Docket 2881).

Aug. 4. Oral argument in Boston-New York-Atlanta-New Orleans route case. (Docket 730 et al.)

Aug. 18. Hearing in Chicago-Helicopter service case. Extended from July 28. (Docket 2384 et al.)

Sept. 2. Hearing in Latin American Certificate Amendment cases of Panagra and Braniff. (Dockets 2527 and 2622.)

Sept. 8. Hearing on Mid-Continent's proposed service between Minot, N. D., and Regina, Saskatchewan. (Docket 628.)

Sept. 8. Hearing in case involving additional service in California-Nevada area. Postponed from Aug. 25. (Docket 2109 et al.)

Sept. 29. Hearing on Mid-Continent's application for alternate Kansas City-New Orleans Route. (Docket 1956.)

Oct. 7. Hearing involving additional Florida Area Service. Postponed from Aug. 12. (Docket 1668 et al.)

Nov. 15. Hearing on Board's Investigation of Consolidated Airfreight Tariff Agreement. Docket 2719).

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AIRLINE TRANSPORT Pilot, 6300 hours 0-6600 hp rating, 12 years experience in aviation flying all types of twin and 4 engine equipment on domestic and international airlines and executive pilot. Can furnish best of references. Married, reliable. Desires position with company as executive pilot. PW-1135, Aviation Week, 330 W. 42nd St., New York 18, N. Y.

THE AIRMAN'S guide has been discontinued because of congressional budgetary cuts. Its editor who has extensive experience in airport and airway operations, public relations, economics, and business management, and who is frequently retained on a consultant basis is interested in leaving government and making an industry connection. He has a commercial license, instrument rating, 1700 hours, and a B.A. in business administration, and is 38 years old. Richard J. Aubry, 708 Grandview Drive, Alexandria, Virginia.

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AN14-93, 1116409,
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Special Screws—DC3 & 4
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134808, 2116354, &
all dash Nos.
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1075888, 124682, &
143908 Series.
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BC-438, SCR-269,
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R680-9	R1830-43
R755-9	R1830-65
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R985-AN-1	R2600-13
R985-AN-3	R2800-43
V1710-81	R2800-51
V1710-99	R2800-75
R1820-97	R3350-35

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4G8-G13, 4L11, GIJ,
4K11-GOJ, 4K11-GOL.

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G-6, G-6A, E-80, F-2,
JH-3R, JH-4ER,
JH-5F, JH-5B, etc.

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OFFICIAL PROPOSAL

Bids: August 19, 1947 (100)

Leasing and Operating of Airport

Sealed bids for the leasing and operating of a public airport known as Linden Airport, formerly known as the Eastern Aircraft Airport at Linden, N. J., located at U. S. Route 1, State Highway Route 25, and Stiles Street in the City of Linden, Union County, New Jersey, will be received by the Governing Body of the City of Linden at the City Hall, Wood Avenue and Blancke Street, Linden, New Jersey, until 9 P. M. Eastern Daylight Saving Time on Tuesday, the 19th day of August, 1947, and then publicly opened and read. Bidders may obtain "Information for Bidders and Specifications" and additional information from City Clerk, City Hall, Linden, New Jersey.

Each bidder must deposit with his Bid a certified check made payable to the order of the City of Linden in the amount of $5,000.00, subject to the conditions provided in the "Information for Bidders and Specifications".

No bidder may withdraw his bid within forty-five (45) days after the actual date of the opening thereof. The right is reserved to reject any or all bids, to waive any informalities in the bids, and to accept the bid deemed most favorable to the interests of the City of Linden.

By order of the Common Council of the City of Linden.

Thomas J. Wieser
City Clerk

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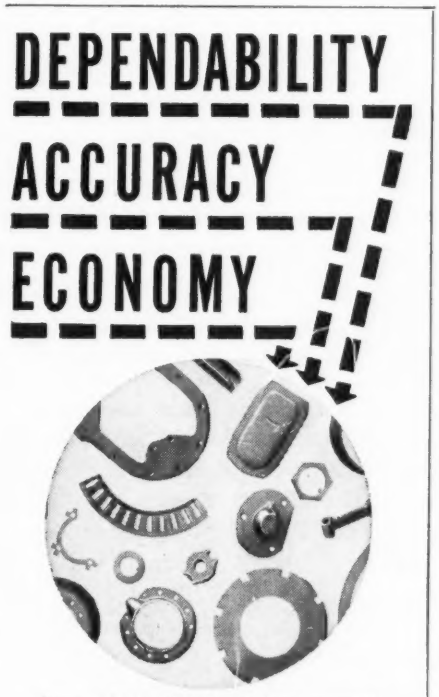

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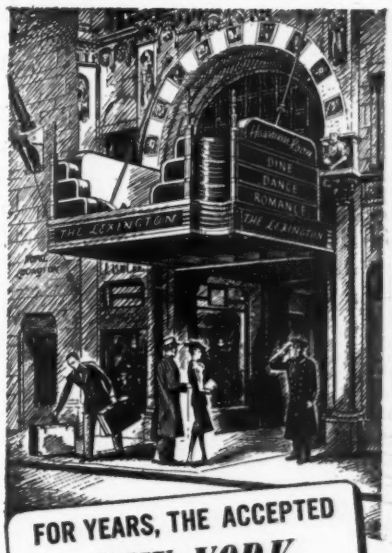

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EDITORIAL

Politics Again

Primarily because Elliott Roosevelt has potent political enemies, some of whom support election campaigns of men on Capitol Hill, we are going to see another "investigation" of an aircraft manufacturer.

Sen. Brewster seeks to subpoena documents of the White House in connection with orders given by the government to Howard Hughes. The canny Brewster's keen insight into publicity prompts him to summon a number of Hollywood glamor girls to his Washington inquiry.

Washington observers think the proceedings which open next month will be one of the cheapest spectacles Capitol Hill has ever pulled.

It has never been any secret in Washington that the order the government gave for the giant cargo-carrying flying boat was President Roosevelt's idea. Neither of the air services, according to reliable reports at the time, was slightly interested in a giant plywood plane. Both Army and Navy fought shy of it vigorously. So did the rest of the aircraft industry. So the President "asked" RFC to back the project.

The Government, meaning the White House, was determined to see the big ship through. Howard Hughes, never a conventional manufacturer, but always interested in aeronautical research, saw an opportunity to experiment with the bonded plywood process which he owned. As in his other research projects, he is reputed to have poured much of his own money into the big flying boat.

As for Hughes' failure to deliver certain experimental military aircraft, there was nothing unique about that in our war experience. The Army and Navy initiated designs for scores of test aircraft which were abandoned.

We are not defending Howard Hughes or any other manufacturer, nor do we think war contractors should be immune from Congressional investigations. But when we see an "inquiry" start out like this one, with all the signs of a smear campaign planned to monopolize the tabloids with testimony of beautiful Hollywood girls, girls, girls, we think Capitol Hill is stooping very low indeed. We don't believe either facts or justice are the objectives of this spectacle.

Two Air Policy Boards

The aircraft industry, which for months has fought for establishment of an air policy board along the lines of the old Morrow group, suddenly finds it has a commission named by the President and promise of another to be created by Congress.

The situation developed so rapidly last week that many industry observers are breathless, unable to venture a guess as to whether it's all good or bad. No one denies that there is a sizeable chunk of dynamite in the machinery. The fervent hope is that we can prevent concussions. The dynamite enters the picture at the beginning. It's the jealousy that some Capitol Hill people have for the President's group. We shall have two groups working on the same subject at the same time.

On the President's commission are men with backgrounds of general business rather than commercial aviation. The congressional board will utilize their legislative and political experience. Few are likely to have outstanding business attributes, but the industry hopes the appointees will be noted for their statesmanship and their awareness of world affairs.

Sources of information will be the same for both commissions. It is in the interpretation of that information that the disagreements can be expected.

There have been too many air policy commissions, committees and boards already. Their voluminous findings have been packed away in store-rooms and libraries with no more attention than momentary publicity. Now that the President of the United States and the Congress have suddenly paved the way for a special group to report to each, the possibilities of an adequate national air policy are brightened impressively.

The aircraft industry and the nation's airlines will cooperate completely with both committees. Information will be available to the investigators at a moment's notice. Every phase of commercial aviation will stand ready to be of service to the President and Congress.

Key to success, however, lies in the men who are appointed to these commissions. Will they be big enough to put the interest of their country above politics and petty prejudices? Will they be able to cooperate, or will they sink to headline hunting? We have every confidence in the President's appointees. These have been announced and they are excellent selections.

But air policy depends in large measure on Congress for implementation. It is also in Congress that the appointments are still to be made. If they are statesmen, the success of both commissions seems assured. If they are politicians air power and the country are still bogged down in confusion.

ROBERT H. WOOD

*Speed Nuts** on the Douglas "Skystreak"

The New Supersonic *"Skystreak"* uses 399 TINNERMAN FASTENERS

The new Navy Douglas "Skystreak" is a revolutionary research airplane designed to whisk across the skies and challenge the weird phenomena of the sonic barrier.

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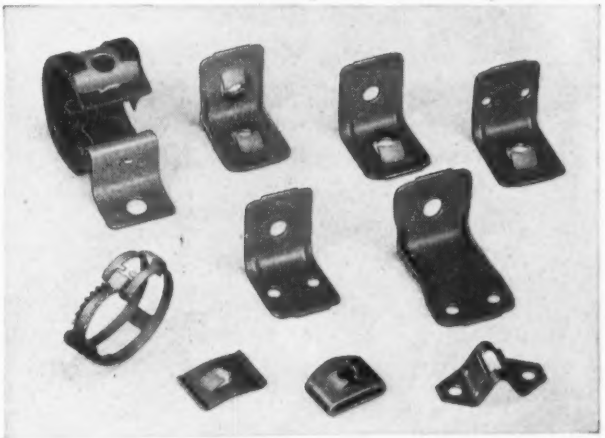

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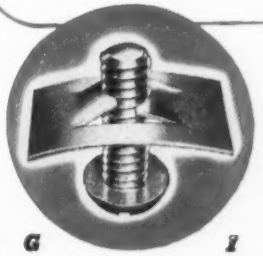

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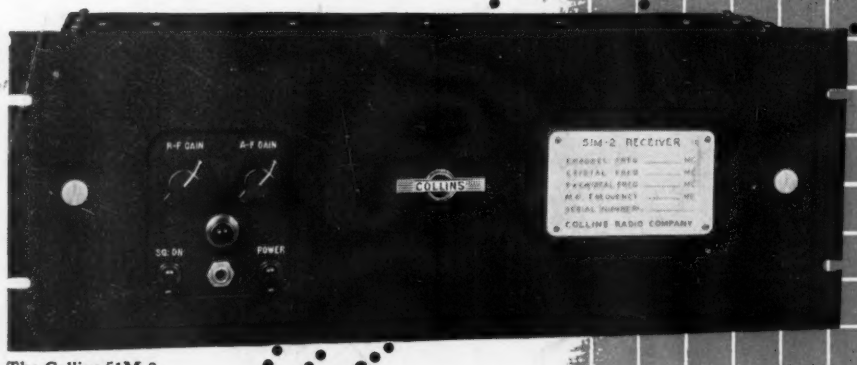

The Collins 51M-2
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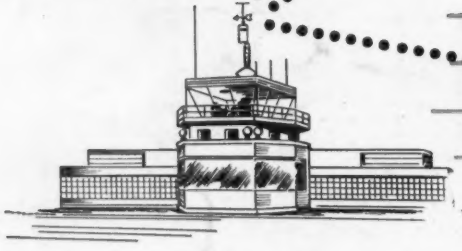

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